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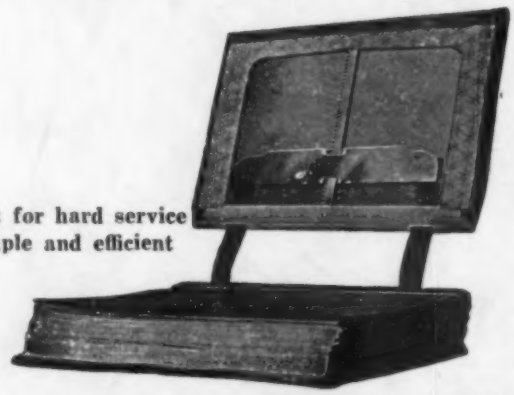

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Colonel Patrick J. Hurley

Secretary of War

INFANTRY JOURNAL

Vol. XXXVI FEBRUARY, 1930 No. 2

The Problem of the Last Eight Hundred Yards

BRIG. J. F. C. FULLER, British Army

The Problem

IN this paper I have attempted to outline a problem which more particularly influences the British Army, but which in general concerns all armies, because all armies are still preeminently infantry organizations. In brief the problem is this:

The offensive power of infantry is on the wane, because the defensive power of infantry is increasing. We cannot scrap our entire army and replace it by something new and more effective. How then are we going to modify our army to meet and partially overcome this difficulty?

Today we are an infantry army thinking in terms of mechanization, and we are thinking of mechanization in terms of infantry, and as we recognize little or no change in the infantry idea our tactics have become muddled in the extreme.

What then is the infantry idea? Is it a constant or a mutable factor? History will show us that it is the latter, and that it is governed by the power of cavalry—the complementary arm.

When no cavalry were used, as amongst the Spartans, the infantry idea was an exceedingly simple one—a line of men advanced against a line of men, and unless it was long enough to overlap the opposing line, the battle was decided by pluck and muscular endurance. Tactics simply consisted in pushing pikes; of command there was little or none, and tactical skill was replaced by grit.

When cavalry is combined with infantry we see a vast change in the infantry idea. The assault is no longer carried out to push the enemy over and destroy him, but to hold him in a clinch, and so gain time for the cavalry to maneuver round his flanks and toward his rear. From a smashing force infantry become a holding force, they pin down the opposing infantry, and the cavalry sticks the enemy's foot troops in the back.

When infantry and cavalry oppose cavalry alone, the battle is frequently undecided; when they oppose infantry alone it is normally won at small cost; but when they oppose their like, under the best generals the infantry hold and the cavalry hit, and battles are won more often by skill than by superiority of numbers. Such was the infantry idea until the advent of gunpowder.

At first firearms made little difference, because of their crudeness. But as they became more perfect they in-

creased the power of infantry to resist infantry and cavalry, and so reduced the power of cavalry to attack infantry. The result was that gradually the cavalry idea of developing offensive mobility from the infantry holding attack changed. Cavalry either sought cavalry to fight with, or said to the infantry, "If you will give up holding and return to the assault, and break up the enemy's infantry, we will come forward and annihilate the fragments." The infantry agreed to this, and the fire fight, even as late as the Napoleonic wars, opened at only one hundred paces distance, a volley or two rang out, and a bayonet charge followed. The whole idea was to get home with the bayonet; the bullet was quite a secondary factor.

Until about 1860 infantry remained purely an assaulting arm; cavalry were impotent until the assault succeeded. And when muzzle-loading rifles replaced smooth-bore muskets the assault entered a rapid decline—not that riflemen could not hold an enemy, but because it was useless to hold him, for cavalry could no longer charge, that is, develop offensive mobility from the holding attack. During the American Civil War seven out of every eight assaults failed, and so completely had the bullet defeated the bayonet that infantry on the defense, especially when intrenched, could nearly always beat back a very superior frontal attack. So powerful had become the defensive that in the war of 1870-71 not one single frontal attack by either Prussians or French succeeded. The assault was dead.

During this period in the history of tactics the central infantry problem was to resuscitate the assault. It was no longer a matter of rushing over a one hundred yards of ground and then charging with the bayonet, but of methodically working forward over many hundreds of yards and then hoping to charge. It was entirely a problem of fire-power, depending very largely on holding the enemy by artillery fire, and developing from this operation infantry mobility. In fact, in their own way, infantry were attempting what cavalry could no longer do.

The rifle, however, soon shattered this imperfect theory. Increasing in range, the bullet forced the attacker to begin deploying at one thousand yards. Further than this, it drove the field gun almost off the battlefield, until at the beginning of the present century, the gunner had to adopt indirect laying and elaborate a complex system of observation and communication. The assault had long been dead, now the rifle attack began to expire. In the Russo-Japanese War attacks covered days; in the World War, weeks. The attack then died; and further, the approach died, for when once fronts were intrenched and wired it was scarcely safe for the infantryman to raise his head above his parapet, and sheer suicide to move forward. All this is common knowledge, and there are several million men alive who know that this statement is no exaggeration. As the cavalryman of the eighteenth century said to the infantryman: "I can no longer charge until you have assaulted," the infantryman of the twentieth century says to the gunner: "I can no longer assault until you have blown the enemy to pieces."

This then is the pivot of the present muddle—the assault. The assault has been dead since 1865, yet infantry will

persist in revolving the whole of their battle tactics round this idea. Since 1870 the frontal assault has persistently failed for the simple reason that a rifleman on the defensive can shoot down a dozen or more riflemen sent forward to attack him. The holding power of the defensive is so strong today, and the range of rifle fire is so great, that in open country it may be accepted as a fact that at eight hundred yards distance from the defender the attack is brought to a standstill, and that from this distance it is not possible to do more than hold a fraction of the defender's force, because a few well-placed machine guns will hold up an attacking brigade.

If the assault is to continue to be the infantry idea, then the problem is a perfectly clear one: infantry must be endowed with the power of advancing over these eight hundred yards, not in weeks but in minutes. But is this the best thing to do? Should not the tank, a piece of mobile armored artillery, be contrasted with the infantry idea rather than absorbed by it? Obviously, in one respect the tank resembles cavalry, namely, in cross-country mobility. Less obviously (because we have forgotten the true rôle of cavalry) being armored it can charge where cavalry can no longer exist. If equipped with lances it could do so far more effectively than cavalry. But no one would suggest so archaic a weapon, in spite of the fact that the majority of us still adhere to an equally archaic idea, namely, that the ultimate aim of infantry is to close with the bayonet.

Given tanks and infantry, and equating their powers, we can, so I hope to prove, get back to the old cavalry-infantry idea of infantry hold, cavalry hit.

The whole of this problem revolves round the last eight hundred yards. If infantry can be so equipped, or supported, that they can advance over the last eight hundred yards, or anyhow can move several hundred yards nearer to the enemy than they can today, they will force him to strengthen his defensive front, to draw on his reserves, to immobilize himself—and consequently they will hold him. They may threaten assault if you like, but their idea is not to disrupt him and risk being disrupted, but to pin him down so that the tanks, the new cavalry, can gain time to maneuver round his flanks and strike him in rear. And the rear is and has always been the decisive point.

What is to prevent this? The bullet? In 1914 bullets were mainly fired from rifles, and static warfare was the result. Today bullets are mainly fired from machine guns; is warfare then likely to become less static? Today four to five times as many bullets would sweep over a battlefield as in 1914, 1915, and 1916. Then we had thousands of guns to destroy rifles and machine guns, today we have about seventy-two to each division; can it be contended that to defeat the bullet, and it is the bullet which is the whole crux of the last eight hundred yards, reliance can be placed on artillery? Obviously the answer is "No."

What, then, can we do?

Remember the problem: that the infantry should be able to advance over the last eight hundred yards, and by constantly threatening the enemy compel him to increase his defensive power

by drawing on his reserves, and so force him to fix himself.

Remember the conditions which surround this problem: money is always short in peace time, and we can expect no drastic change; the best is enemy of the good; we must work from what we have and what we know.

How can we resuscitate the mobility of infantry? Strategically by motor transport, tactically by armor. Armor is the enemy of the bullet. A quarter of an inch of steel will keep out the rifle bullet, and half an inch the rifle armor piercing bullet. Half an inch is what we want; it may not keep out the heavy bullet or the shell, but this is not the immediate problem. One at a time, let us first defeat the bullet, and when once this problem is solved, we can turn to the next.

We cannot armor all our infantry, but we know that we can obtain quite a good light tank. We have today in the British army, anyhow theoretically, sixteen machine guns and four anti-tank weapons in each battalion. For an Oriental war twenty machines per battalion would probably be sufficient, and in a European war gold will flow like water, so an increase in this number need not perturb us. Now as to their use.

An attack is launched. At eight hundred yards from the enemy it is halted by rifle and machine gun fire. In place of calling on artillery, one to two miles in rear, to fire at a target which the infantry themselves can seldom see, out go the mechanized light infantry armored scouts. All they know is the area from which fire is coming. They make towards it, hunting their enemy. If frontal fire is too strong they swing to a flank, they draw fire and deliver fire, then a novel thing happens. A fraction of the rifle line behind them moves forward from eight hundred to seven hundred yards, range perhaps to six hundred yards—a most astonishing innovation. The light tanks work up a hedge, round a hill; the enemy is pushing up reserves, but they head them off and climb its slope. Five minutes later a sight is seen which has not been witnessed for fifty years; some riflemen are on the hill and they have moved eight hundred yards in twenty minutes. They take the hill by assault? No. They merely occupy the hill, and begin enfilading the enemy on their right. They are heavily counter-attacked and driven back? They have lost the day? No. They have begun to win it. They have forced the enemy to draw on his reserves, those forces which are an assurance against the unexpected and a security to his rear. Two or three more such engagements and the enemy will be fixed. All his troops will be tired, if not actually absorbed in the defense. Without reserves he cannot organize a retirement—he is fixed, anyhow for a time—and he never knows what the armored light infantry will not do, they are like hornets.

Have we solved the problem of the last eight hundred yards? Yes, we have solved it anyhow against an enemy unprovided with light tanks, and should an enemy possess them, then must the problem be reviewed and modified accordingly. But have we completed our task? No. We have only prepared the way. Holding must be followed by hitting—and never hit a man in front if you can hit him in the back.

Once the enemy is fixed—that is, his

power to move is reduced from a fluid to a glutinous, if not a solid state—the grand maneuver can begin, but not before. To send armored forces wandering into the blue is to ask for trouble, for the enemy may disperse. What is required is a concentrated target; therefore he must be induced to put all his eggs into one basket.

What type of force do we want for this maneuver? Not a cumbersome army of all arms, but a force somewhat like the old independent cavalry—light cavalry to find, heavy cavalry to hit, and a few guns to protect. Above all we want a mobile force, and simplicity normally assists mobility.

Embussed infantry accompanied by light tanks and mechanized artillery would certainly be better than infantry on their feet, machine guns in limbers, and horse-drawn artillery. But today we possess far more suitable arms, namely, armored cars, light tanks, and medium tanks. We may sometimes require a mechanized bridging train, but we do not want field guns, or medium guns, or sappers, or infantry, or cavalry, because we want mobility, and because this force is going to strike at weakness and not at strength. This is what the old and rightly renowned cavalry did. They did not bump their heads against unbroken infantry—anti-cavalry forces; they avoided them. Why then should we expect their modern counterparts to assault antitank localities and weapons. True, they may meet them, but then they will avoid them; they will not assault or charge them, for such action is not at present their task. Today we hear a great deal about the cavalry spirit, but this spirit may lead us into an excess of folly unless we understand true cavalry action—to use mobility to develop offensive power against weakness, and not against strength.

This force, the force for the grand maneuver which should be the central idea of every battle plan, we see in embryo today in the projected armored brigade; a force which, if we do not focus our tactics, will die in the womb, or be born a monster.

Today we do not want a mechanized army. We want to solve the problem of the last eight hundred yards. In the future we may want a mechanized army, and if we do, it must grow out of our existing army, and not out of a fraction of it. We want to solve the problem of the last eight hundred yards, and to gain full benefit from it once we have solved it. Here then is the object of an armored brigade—to crown our problem and so endow the tactical idea which underlies it with full power to govern our unimaginative army.

Given an armored brigade of one battalion of armored cars, two battalions of light tanks, one battalion of medium tanks, and a properly organized supply column, and hinge this force to the existing army only slightly mechanized, then for the time being we have a superb army, because it is organized on a fundamentally sound tactical idea. Further still, it is so organized that it can grow to plan, namely steadily increasing mechanization, should other armies begin to mechanize.

Before I end this paper there are two more points I should like to discuss. They are the suitability of the

medium tank, and the nature of the supply column in the armored, or hitting, force.

Is the medium tank what an armored brigade wants? Examine this brigade tactically. It is not purposely going to bump up against formidable opposition, that is, against antitank weapons. Its armored cars will scour the country, and its light tanks can fall upon the rear of the enemy, and attack his line of communications and his rear services. They may be met by their like, or by medium tanks, or they may want gun support. They, therefore, want some base to operate from, some supporting force, which is more powerful than they are, and which is pre-eminently composed of antitank tanks.

The medium tank is too much a general purpose machine to fit this category. It may be an excellent divisional weapon—a weapon to support infantry—but it is not in my opinion a good antitank tank. What I suggest in its place is a low, fairly long, powerfully engined machine mounting one three-pounder gun, or a .8-inch machine gun, protected in a turret or by a roofless circular shield. If the latter, the shield might be so constructed that it can be closed to a semi-circle, and thus double the armor should antitank weapons be met with. I do not see why the crew should be more than four men. This weapon would represent the artillery of the armored brigade, designed as an antitank weapon, and not an anti-infantry weapon like the eighteen-pounder field gun.

As regards the supply column, adequate and continuous supply is essential to the maintenance of the grand maneuver. Frequently the armored brigade will be miles away from its base, namely, the services in rear of the main army. Its line of communications will be an open one, and liable to be attacked by armored cars and ordinary motor cars. I suggest that, like the supply organization of the old independent cavalry, it should be equipped with two supply columns. One will go forward full, and the other will go back empty, and each will carry several days' supplies. These columns will require an escort, and should be provided with one of their own—an escort of armored cars and light tanks, and possibly also a battery of antitank tanks. With such an organization the brigade should seldom be in want.

Rifle Marksmanship and Battle Efficiency

MAJ. ALEXANDER L. P. JOHNSON, Infantry

NOT so many years ago, when the average rifle company qualified only two or three expert riflemen, perhaps a half dozen or so sharpshooters, and a few marksmen, the unit that did better than the average was sure to arouse considerable envy and occasionally some suspicion that perhaps it was something else besides "just good shooting" which produced the unusual results. Today, with eighty per cent qualifications as a minimum requirement and one hundred per cent qualifications occurring with sufficient frequency to elicit no more than passing mention, we must acknowledge that the Army has made considerable progress in this particular field of endeavor. Improved methods of training, greater attention to the individual and closer supervision of instruction had no doubt a material share in bringing about these results. In some measure, perhaps, the success may be due to an easier qualification course: perhaps, also, to a better type of young men enlisting in our post-war army. Be that as it may, the results clearly indicate what can be accomplished in this important phase of military training with ample time and facilities at our disposal.

The object of all military training, and, therefore, of rifle marksmanship, is to make the individual soldier an efficient and effective member of the fighting team on the field of battle. His value as a rifleman, therefore, depends upon his ability to make effective use of his weapon under battle conditions.

Our scheme of national defense provides for a highly skeletonized Regular army. It is, in effect, the training cadre not only of its own personnel but necessarily the training school and reservoir of competent instructors of the other two components of the Army of the United States. The first requirement of a competent instructor is a thorough knowledge of his subject; hence a competent instructor of rifle marksmanship ought to be a qualified rifleman. That our system of rifle training is calculated to produce competent instructors admits no contradiction. We may well ask, however, if this system is capable of producing, from raw levees raised in emergency, riflemen who will be effective under battle conditions.

The first serious defect of the system is that it requires too much time. This is recognized by Training Regulations, which make provision for a reduction of the period of rifle training in time of an emergency. (T-R 150-10 per. 4g.) If the time allotted to this work in time of peace is absolutely necessary to the achievement of a degree of proficiency which we have adopted as the standard, then a shorter period devoted to this important phase of training must necessarily entail a lowering of the standard of proficiency. If eighty per cent qualifications mark the effective and efficient rifle company in time of peace, then the acceptance of

a lower proficiency in the face of the enemy is certainly undesirable. If, on the other hand, the same results can be obtained in the reduced emergency training period, we are now wasting on rifle marksmanship a lot of time and much good money that we might use otherwise to advantage. In any event, it suggests the necessity of devising a marksmanship course which will produce effective riflemen in peace and war in the shortest possible time and at the least expense.

The second serious defect of our present system is that it requires extensive and expensive target range facilities. Suitable terrain is not readily available, and where it can be had a target range is expensive to install and to maintain. If it be deemed necessary to give each individual rifleman in time of peace practical training in firing at known ranges up to six hundred yards and qualified men up to one thousand yards, we must justify it on the grounds of probable battlefield requirements. That being so, how can we justify limiting the marksmanship course to two hundred yards or perhaps three hundred yards with the enemy at our gates?

The handicap to training entailed by the lack of suitable target range facilities is heavily felt by the National Guard. Only the exceptional unit is fortunate enough to have a suitable target range within convenient distance of its home station. The natural consequence is that few National Guard units complete their rifle training before the annual field training period, and consequently must devote much time to range firing during the encampment, which could and should be given to other important work.

Our system of rifle training results from our inclination to view rifle marksmanship as a sporting proposition rather than a problem of warfare. The individual score on the target range is of greater interest to us than the probable fire effect on the field of battle. We are devoting time and energy to improving the target range score of the individual soldier. We hold out special inducements in the form of badges and extra pay to improve the result. We concentrate on getting one hundred per cent individual qualifications, but neglect the marksmanship proficiency of units. In battle, physical condition and morale seriously influence the effectiveness of rifle fire. The adaptability of target range habits and indoctrinations likewise bears a close relation to battlefield results. Obviously habits are of value only in so far as the soldier is able to apply them mechanically while he is himself under fire. Any target range condition which is not suited to the battlefield is psychologically wrong, as it will tend to impair the soldier's confidence in his weapon at a time when he needs that above everything else.

In olden days the short range of weapons and the complicated methods of loading compelled combatants to open fire at short ranges and generally from a standing position. Close formations and strict fire discipline produced remarkable results in spite of the imperfections of weapons. At Mollwitz, in 1741, the Prussians delivered their volleys with drill ground precision. In the modern battle the soldier, in extended order, is left to himself. He finds little use for the fine artistry of rifle firing that he learns on the target range. Lying prone behind cover, he is reluctant to expose

himself and, more often than not, will fire without proper aim. Again, in modern warfare, action commences at considerable distances. Errors in estimating ranges are common. Long sustained effort, lack of sleep and food, enervate and demoralize the rifleman. As a result he expends large quantities of ammunition without serious effect.

In spite of continued improvement of our firearms, battlefield casualties from them have not increased in proportion to their improved accuracy. Those who have studied the question of battle casualties estimate that in the days of the flintlock and smoothbore guns four to five hundred projectiles were necessary to put one man out of action. In the battle of Bautzen, in 1813, the French used for each man killed or wounded, an average of twenty-one and six-tenths rounds per gun. In the battle of Leipsic, in 1813, the French used forty-six and six-tenths rounds per gun, while the Allies needed forty-eight rounds to produce the same effect. In three principal battles in the Crimean War the Allies, using a muzzle-loading rifled gun, expended an average of forty-three rounds per gun for each Russian put out of action, while the Russians, using an inferior type Hessian smooth-bore percussion musket obtained the same result by firing an average of only twenty rounds per gun.

During the Austro-Prussian campaign in 1866, the Prussian Army operating in Bohemia expended one million, three hundred and ninety thousand, two hundred and ten rounds of infantry ammunition to produce thirty-six thousand eight hundred and eighty-three Austrian casualties. This represents thirty-seven and seven-tenths rounds of infantry ammunition per casualty produced.

In the Franco-Prussian War seventy-four per cent of the French casualties were due to German infantry fire. During the entire compaign the Germans expended thirty million rounds of infantry ammunition. If the lost and defective ammunition is estimated at five million, then the remainder killed or wounded ninety-one thousand two hundred and fifty men, or an average of two hundred seventy-four rounds per casualty. French data are available for only certain battles. At Worth, the French, using the long Chassepot rifle, used two hundred and thirty-seven rounds, compared with three hundred and thirty-three rounds that the Germans fired, for each casualty produced. At St. Privat the French fired one hundred and seventy-eight rounds, compared with five hundred and eighty-five rounds by the Germans to produce the same effect. It must be remembered, however, that the German needle gun was frequently used against an enemy sheltered in trenches.

In the Russo-Japanese War the Russians, in ten battles, expended on an average four hundred and forty-nine rounds for each Japanese killed or wounded. Japanese data are not available except for the battle of Kintcheu, 26 May, 1904, when the Japanese used three thousand two hundred and seven rounds to put one Russian out of action, compared with two hundred and eight rounds by the Russians.

Enormous as World War casualties were, figures will no doubt show a similar ratio between ammunition expenditure and casualties produced.

Even though the result is in inverse ratio to the accuracy of the weapon, the explanation is quite simple. The short range and low rate of fire of the old musket allowed ample time for aiming, and the targets were clear and distinct. Again, wars were fought by professional soldiers of long service who had learned to endure the rigors of a campaign. The vast disparity between recent battlefield and target range results must then be ascribed, in some measure, to the physical and moral condition of the soldier and to even a greater extent to the conditions of modern battle which render the effective use of weapons more and more difficult. This situation then defines our problem more accurately. We must produce riflemen of maximum effectiveness to meet the conditions of modern battle, and we must secure that result in the minimum of time. This means the elimination of all nonessentials and concentration of effort upon essentials. It means something more. We must give the soldier a weapon of great accuracy combined with maximum facility of effective operation.

Good shooting involves two acts, correct aiming and trigger squeeze. Aiming is by far the more difficult task. Our present training system devotes, therefore, much time and effort to sighting and aiming exercises. We teach the effect of light and shadow, and emphasize the importance of blackening the sights. We dwell upon the error of canting and point out the effect of wind upon the projectile in flight. All this is important to the expert rifleman, but confusing to the recruit. Obviously, our first task is to simplify the process of aiming. This can be accomplished by the adoption of a front and rear sight which will eliminate or at least materially reduce blurring. Again, there should be no necessity for blackening sights. Blackened sights may serve as good and useful aids for high-score shooting on a target range, but on the battlefield—the very thought seems preposterous. Front and rear sights should be of black metal which remains black and does not reflect light.

Blurring is caused by the inability of the eye to focus accurately upon objects at varying distances. Yet, in aiming, the soldier is given three points to align, rear sight, front sight, and target. He must focus his eye on one of these, the target. Necessarily a blurring will result. The soldier's desire to get his shot in before the blur obliterates the target causes him to pull the trigger. This is the untrained rifleman's difficulty. To overcome the effect of blurring, we now advocate the use of the peep sight as though looking through a window. This produces a circular blur which leaves a fairly clear bull's-eye for a trifle longer than the open sight. This added "period of grace" is sufficient for the trained rifleman to get on his mark—on the target range. Again, battlefield conditions complicate matters. There the soldier does not shoot at a clear, distinct bull's-eye. On the contrary, his target is an ill-defined line of silhouettes of low visibility. To focus his eye upon targets such as these with a front sight looming up like a sore thumb, imposes upon the soldier a strain which is not conducive to good results. His eye will focus upon the brightest object in his field of vision, be it any well-defined point of the

landscape, or the front or rear sight of his rifle. Whichever it may be, the result will probably be a miss. Success of infantry in battle depends, in the last analysis, upon the effectiveness of the Doughboy's own fire with rifle, automatic rifle and machine gun. The criticism applies to the last two with equal if not greater force, considering their vastly higher rate of fire and consequently much greater consumption of ammunition.

Low visibility of targets is not the only obstacle to effective shooting on the battlefield. Fatigue, loss of sleep, mental and physical strain, hunger, which all react upon the eyesight, must also be taken into consideration. If a rested eye has difficulty in overcoming the effects of blurring, the task will become hopeless if imposed upon a tired, bloodshot eye. It is, therefore, an imperative necessity to equip our rifles with sights which will eliminate blurring as far as possible and permit the soldier to aim rapidly and correctly without strain upon his eye regardless of his physical condition.

The soldier is taught to focus his eye upon the target. In the actual sequence of things the eye first sees the rear sight, then the front sight, and finally the target. Since the accuracy of the aim depends upon the correct alignment of these three objects, it is important that both front and rear sights be so constructed that they will facilitate the soldier's task. We must bear in mind that the easier a given task, the longer we may sustain effort in its performance. Sustained effort without impairment of efficiency is a *sine qua non* of modern battle.

The sights of our service rifle are not suited to modern battle conditions —irrespective of what target range experts may say in their favor. The exceptional achievement of men like Sergeant York certainly cannot be taken as proof of suitability. Moreover, Sergeant York fired at point blank range and needed no refinements. Its height, width and general shape make it difficult to bring the front sight into correct alignment with rear sight and target. The amount of "landscape" which it permits to intrude upon the line of sight adds to the difficulty and is at least in part responsible for the blurring. The susceptibility of the front sight to the effects of light and shadow is also an important cause of inaccuracy.

We teach the soldier to use habitually the "normal sight." It is a trifle easier to obtain this alignment with the open than with the peep sight. The shoulders of the open sight assist the eye, but the horizontal line across the drift slide is of no help since the eye is focused upon the target. Hence, by using the peep sight, the soldier must estimate the center of the aperture. This is simple enough for the trained eye, but difficult for the untrained or fatigued eye.

A satisfactory front sight that conforms to the conditions and requirements of modern warfare is the Kokotovic front sight, named after its inventor, a retired colonel of the Yugoslav army. It consists of a control plate or ledge from which the front sight proper extends upward. This front sight is shaped as a trapezoid and is characterized by its broad flat top. The height of the front sight above the control plate is two millimeters and its width at the top is two and a half millimeters. The control plate extends laterally from each side of the base of the front sight and

KOKOTOVIČ FRONT SIGHT

a-front sight stud b-ledge

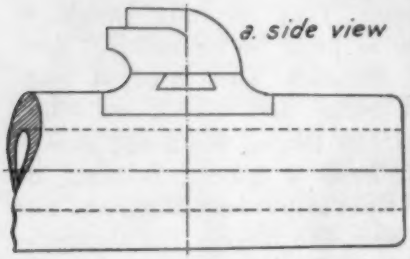


fig. 1

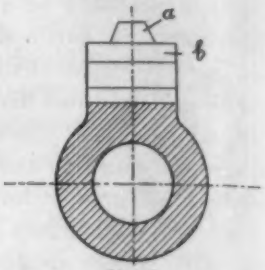


fig. 2

serves as an automatic detector and corrector of error in aiming. The front sight tapers away from the eye, hence does not reflect light or throw a shadow. It is used in combination with a V-shaped rear sight. This combination enables the soldier to bring the upper edge of the front sight quickly and easily into a correct alignment with the top of the front sight, and the shoulders of the rear sight will appear to lie in the same straight line, broken by a small triangular gap on each side of the front sight. The two elements of the front sight, the ledge and sight proper, are so formed and arranged that when too much front sight is taken by the soldier, the top of the ledge will show in the rear sight notch. Similarly the least lateral deviation from the true aim will cause the appearance of this ledge or control plate on the side opposite from the direction of error, while on the side of the front sight in the direction of the error the gap will decrease or disappear altogether, depending upon the amount of error. The same effect is produced by canting. A fine sight will produce V-shaped gaps with one side longer than the other while the top of the front sight appears distinctly depressed below the level of the shoulders of the rear sight.

Owing to these characteristics, the Kokotovic front sight used in combination with a V-shaped rear sight, helps the eye and enables the soldier to aim more rapidly and with greater accuracy. The normal sight is obtained uniformly and without effort. Uniformity in aiming will necessarily result in a better placing of the shot group. Dispersion in depth decreases and the infantryman's fire becomes correspondingly more effective. Moreover, owing to its size and shape, the Kokotovic front sight is less susceptible to damage by rough usage in the field than is our present front sight.

The Austro-Hungarian military authorities subjected the Kokotovic front sight to extensive tests even before the war. Its superiority over the high and narrow type front sight was quite apparent to the rank and file, but military theorists were unable to break with the fetish of tradition. "Don't shoot until you see the whites of their eyes" was not a Bunker Hill invention. Its origin goes back to the first firearm used in warfare. To it we owe the bull's-eye target. It led to the adoption of more and more delicately edged front sights. That was well enough as long as ranges were short and the individual soldier's ammunition expenditure in course of an action was comparatively small. Our

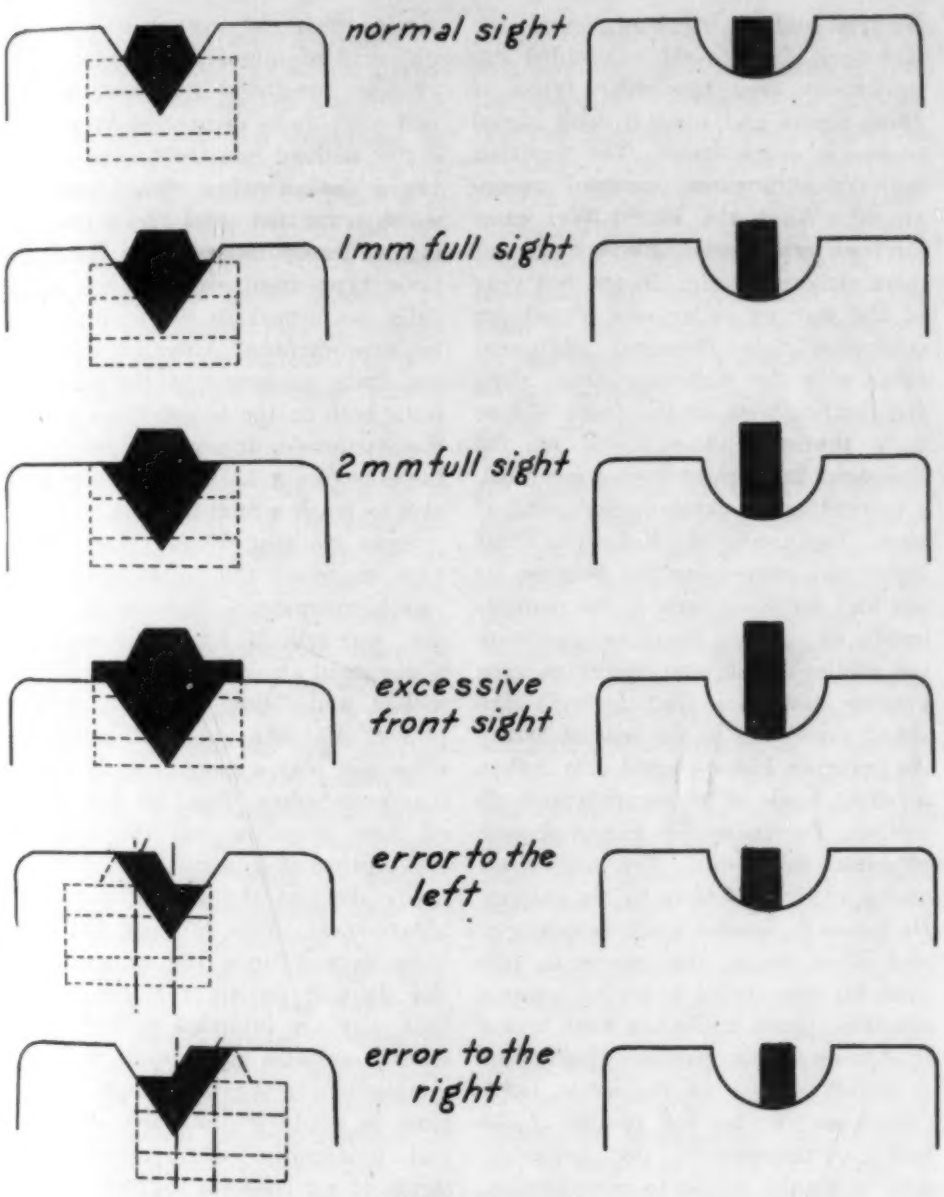


fig. 3

own regulations at one time restricted the soldier to forty rounds on any one day on the target range. This restriction certainly was not a measure of economy, but rather one of necessity. It appreciated the strain to the eye which would result from more prolonged effort, to the detriment of the score. Modern battle demands of the individual soldier a much greater expenditure of ammunition. Clearly, if sustained effort on the target range diminishes effectiveness, such result must be even more pronounced in battle.

Civilian riflemen and rifle teams in

Austria and Switzerland found the Kokotovic front sight a decided improvement over the older types of front sights and used it with signal success in competitions. The Austrian military authorities remained unconvinced. When the World War came the tests were continued on a more and more elaborate scale. In the last year of the war an order was placed for equipping fifty thousand additional rifles with the Kokotovic front sight for further tests at the front. These tests confirmed the worth of the Kokotovic front sight from a technical, a tactical, and a psychological point of view. Technically the Kokotovic front sight was proved correct because its size and shape conform to the requirements of modern warfare, facilitate the soldier's task, and therefore, give greater assurance that he will fire aimed shots even in the heat of battle. An accurate, high-powered rifle is thus in effect made more accurate and effective. Tactically this means greater potential fire-power. The soldier acquires a new confidence in his weapon. He learns to depend upon its accuracy and effectiveness. He learns to rely upon his own ability to use his weapon effectively even under the most trying conditions. This psychological effect is bound to have an important influence upon the tactical results of the battle. Furthermore, the Kokotovic sight is sturdy, simple to manufacture, and inexpensive.

Long before the World War the military value of the high and narrow type front sight was sharply challenged by military experts in Germany as well as in Austria-Hungary. In an article published in the *Militär Wochenblatt* in 1908, Major von Parst, of the 12th Royal Bavarian Infantry Regiment, emphasized the fact that the strain upon the eye, caused by the difficulty of aligning such sights, absolutely precluded long-sustained effort such as is demanded by modern battle, without loss of effectiveness. He urged the adoption of a front sight which permitted quick and facile aiming, and specifically named the Kokotovic type front sight as one which fully conformed to the conditions of modern warfare. Although this view was fully confirmed by the numerous tests, both on the target range and on the battlefield, the war ended before the Austrian military authorities were able to reach a final decision.

Some eminent World War leaders have expressed the opinion that post-war developments indicate that the next war will be fought by comparatively small armies, highly mechanized, mobile, and capable of great striking power. Machine guns and automatic rifles will play a more important part than ever before. The high rate of fire of these weapons, and the resulting expenditure of ammunition, will necessarily demand the highest degree of effectiveness. This in turn will evermore depend upon the suitability of the sighting devices for the purpose that they are intended to serve. Obviously, suitable sights must facilitate aiming, not make it difficult. They must be conducive to speed, accuracy, and uniformity. Our present rifle sights do not conform to these requirements. The Kokotovic sight simplifies aiming and to that extent reduces the time of instruction. Training becomes more effective and efficient as well as more economical. Adoption of correct sights is then the first step toward solving our problem. The Kokotovic sight deserves serious consideration.

While on the subject of correct sights, the tactical value of the wind

gauge also deserves some thought. Its purpose is to correct for lateral deviation of the projectile on account of wind or drift. It is a useful aid in competitions and in target practice of the type now prescribed in our service. It is a valuable aid for correct adjustment of machine gun fire where concentration is desired. As an accessory to rifles and automatic rifles in modern battle it is next to valueless. The normal battlefield target is linear. Effective fire requires lateral distribution. Lateral deviation of the individual projectile because of wind or drift is immaterial; it will not influence the effectiveness of our collective fire as long as the center of impact is correctly placed. Moreover, in battle the rifleman has neither time nor means of checking the effect of wind and making suitable correction for it. It is extremely doubtful if one rifleman in a thousand ever gives his wind gauge a thought in the heat of battle. It is part and parcel of our target range artistry for which the modern battlefield provides neither time nor place. The elimination from our rifles of the wind gauge is not advocated, but instruction in its use and application should be limited to men especially selected for further training as snipers, noncommissioned officers and instructors. It will continue to serve its purpose in competitions. The automatic rifle, on the other hand, might just as well be without this device.

We devote valuable time to instruction in the use of the loop-sling and the hasty sling. The loop-sling may be of some value on the target range. On the battlefield it is completely out of place. There it does not contribute materially to improve the effect of the fire, but does effectively restrain the soldier in the free use of his weapon in a hand-to-hand action which follows the fire fight. Since all peace time training is or should be calculated to promote battle efficiency, everything foreign to that purpose must be eliminated. The hasty sling is the only kind that can be used in battle. Its use, therefore, must become a fixed habit and should be made mandatory for all occasions, whether firing or simulating fire.

The infantryman's battle efficiency will, to a large extent, depend upon the good habits fixed in him by his previous training. The acquisition of habits which do not improve the soldier's battle efficiency retard his training. Still, we do that very thing when we permit, encourage, even insist, that soldiers on the target range use shoulder and elbow pads. This stimulates a bad habit that deserves outright condemnation. The soldier accustomed to shoot with such pads will be less effective if not wholly ineffective without them. The use of pads encourages gun shyness, fear of the blow of recoil. By permitting their use we foster this fear complex, to the detriment of battle efficiency.

In our desire to improve target range scores we discontinued the use of the battlesight. All reference to it apparently disappeared from our training regulations, which now prescribe sight setting for the exact range in all classes of firing. That may be well enough for target practice and competitions. On the battlefield, however, we sacrifice thereby the most important advantage of our flat trajectory service rifle, the possibility of using a universal sight setting for all short ranges. The soldier accustomed to the use of the raised sight leaf will habitually use it. Assuming correct

initial sight setting, the fire will become increasingly inaccurate as the range decreases either by our own advance or that of the enemy. Perhaps here and there a Doughboy, more calm and collected than his fellows, will remember the lessons taught him and will stop long enough to reset his sight. The good example is catching and soon firing will cease while sights are being readjusted. This lull in the fire fight may give to the enemy the opportunity of securing fire superiority, frustrating the attack, or driving home his own assault. The universal sight used habitually at all ranges up to five hundred yards obviates the necessity of resetting of sights during the most critical stages of an action. The elimination of the battlesight was a grave mistake from the point of view of battle efficiency. Our insistence upon the use of the peep sight for rapid fire is an outright blunder. The peep sight may improve target range results but it is useless to the bloodshot eyes of the rifleman on the battlefield. His fire will consequently be neither rapid nor accurate, but on the contrary desultory and ineffective. The Kokotovic sight permits effective use of the battle sight and gives some assurance that the soldier on the firing line will fire aimed shots, and not merely pump lead.

This brings us to the second phase of our problem, target practice and the closely related subject of target ranges. Systematic and thorough work in the preliminary instruction must of necessity remain a prerequisite to range practice. Elimination of superfluities and adoption of really serviceable rifle sights will help materially in making the preliminary instruction effective, reducing the amount of time it will require. Target practice with the subcaliber rifle has little, if any, military value. As a practical experience, owing to the absence of the recoil, it merely creates a false impression. Psychologically it is an error to resort to this form of firing before having used the service rifle. It tends to overemphasize the force of recoil and fosters gun shyness.

Range practice with bull's-eye targets should serve no other purpose than to test the soldier's ability to apply practically what he has learned in theory. An elaborate course of instruction and record practice requiring extensive and expansive range facilities are utterly unnecessary for this purpose.

The method of procedure which will accomplish our objective is suggested by an expedient introduced into the training scheme of the Pennsylvania National Guard by Col. William H. Oury, Infantry, D. O. L. Confronted with the fact that the majority of the state troops had no rifle practice before coming to camp, and the necessity of making the most of the limited time available, Colonel Oury had a one thousand-inch rifle range, which provided facilities for from fifteen to twenty men firing simultaneously, installed at Mt. Gretna in 1927. Using the service rifle and service ammunition, each soldier fired a course of slow and rapid fire very much as he would on the standard range. The targets were miniature X, Y, and modified Z targets, the latter representing a reduced D target. Coaching and instruction conformed to the provisions of our training regulations. Firing was limited to the prone, sitting, and kneeling positions. Pit details were unnecessary. Each soldier could see the result of his effort and make corrections without the necessity of marking

shots. Each soldier pasted his first score and removed his target after the second. Firing and marking of targets was regulated by the officer in charge. Results were satisfactory, considering the amount of time, one-half day per company, allotted to this important phase of instruction. It clearly indicated what might be accomplished if the scheme were actually given a fair chance. The possibility of installing such a range almost anywhere at comparatively small cost commends it highly for the National Guard, and would make it particularly valuable in a national emergency if we should adopt any decentralized plan of basic training.

Under the Pennsylvania training program developed by Colonel Oury, firing on the one thousand-inch range is followed by limited firing on the class A range. A series of combat exercises for squads, sections, platoons, and companies completes the course of marksmanship training. These combat exercises properly constitute the most important phase of the work and serve to emphasize the importance as well as necessity of thorough, efficient preparation.

Target practice on class A and B ranges must take place at training camps or centers where appropriate facilities are available. Advancement of a unit to the regular range should preferably take place as soon as its personnel demonstrates suitable proficiency. Firing on the known distance range must serve one purpose only, and that is the development of battle efficiency. Considerations of extra pay do not fit in with this purpose. The use of silhouette targets should be its principal feature and characteristic. It is not the purpose of the writer to outline a rifle marksmanship practice course beyond suggesting that, if battle efficiency be our ultimate objective, then we must carry out our scheme of instruction as nearly as possible under simulated battle conditions. The course, therefore, should include firing over the parapet of a standing trench, firing from a sitting, kneeling, and prone position, both in the open and from behind some artificial shelter or cover. The use of the battle sight at ranges up to and including five hundred yards should be the rule. A properly devised course will conclude with an individual proficiency test which should consist of fire and movement.

Musketry and combat exercises must remain the culminating feature of the soldier's marksmanship training. Their importance cannot be overemphasized. Unfortunately our present system, by insisting upon a minimum of eighty per cent of individual qualifications, is conducive to an inordinate expenditure of ammunition which leaves, in the average unit, but little for combat firing. Yet it is only by means of combat exercises that we can develop battle efficiency to the highest point.

To summarize briefly, if we would have battle efficiency we must adapt our training system to that objective. Rifle marksmanship training which fails to conform to the requirements of modern battle may produce target range experts but it cannot produce an effective fighting team. To that extent it represents a waste of time, effort, and ammunition. Finally, we can and must augment the rifleman's effectiveness by equipping his weapon with sights, such as the Kokotovic sights, which will enable him to use it with greater ease and accuracy.

Chief Roman Nose and the Battle of Beecher's Island

CAPT. PATRICK H. KASTLER, 157th Infantry

A ROMANTIC figure in the long history of the Indian troubles in the Far West is Chief Roman Nose. He was a savage leader who used military formations and tactics in his attacks on the Whites, and he figured prominently in the stirring battle of Beecher's Island, where he fell mortally wounded while leading an attack against a small band of scout troopers.

As the years pass, appreciation of the historic aspect of the battle of Beecher's Island grows. Imposing monuments have been erected on the site and it is becoming a prominent historical showplace of Colorado. The island is but a small sand bar around which the Arickaree River has split; such an island as small rivers are wont to expose in their devious windings, and which are frequently washed away in flood-times. Beecher's Island is about fifteen miles from Wray, Colorado, close to the Kansas border.

After the Civil War the National Government, its greatest military undertaking completed, began to lend ear to the appeals of the Far West for protection against the Indians. No less a military personage than General Sheridan received the task of subordinating the pestiferous aborigines.

A fruitless waste of lives had attended most of the Indian campaigns. The wily Redskin faded from before his white pursuers, and eluded troops burdened with military equipment, baggage, and artillery. Sheridan decided on new tactics. On his staff there was a seasoned Indian fighter, Col. George A. Forsyth. Under orders from Sheridan, Forsyth recruited a company of about sixty scouts, men as cunning and crafty as the Indian himself, accustomed to fighting him with his own methods, and, it is to be suspected, in some cases eager to gather red scalps with as much gusto as any ambitious Cheyenne or Arapahoe collected white scalps. As second in command of this organization Forsyth selected Lieut. Frederick H. Beecher, 3d Infantry. The scouts were mounted on the best horses procurable and traveled unburdened with the usual paraphernalia of the Regular troopers.

This efficient organization left Ft. Hays on August 29, 1868, with the mission of pacifying the country around to the Kansas-Colorado border. For several weeks the expedition met with the usual disappointment. When confronted with numerical force the savages were as unsubstantial as wraiths. With suddenness and ferocity they would attack inadequately protected settlements with thousands of warriors gathered together through temporary alliances, but Colonel Forsyth's band met but scattered detachments which could never be engaged. One morning, however, the scouts finally struck in what is now Yuma County, Colorado, what they felt was the trail of a large body of Indians.

As one travels through Yuma County today it is difficult to picture it the same country that Forsyth and his outfit saw. The vast extent of plain and rolling hills which is now dotted

with properous farmers' homes, on which wheat and corn ripen, where well-graded and improved roads cut the townships and sections into precise squares, was then but a part of the great American desert, given over to the roaming buffalo and the wandering Indian.

On the night of September 16, 1868, the company camped near a little island in the Arickaree River, a branch of the Republican River. Shortly before dawn a sentry gave the alarm, "Indians!" He had detected a group of six of the enemy creeping upon the picket line to frighten the horses. Some few of the animals were stampeded by the waving of blankets and beating of tom-toms before the daring group was driven off. The camp was aroused instantly and prepared for anything that might develop.

As dawn crept over the low-lying hills and river-bluffs the dim light revealed to the startled eyes of the expectant scouts a dramatic sight. On all sides the hills were literally covered with Indians who had arrived at this rendezvous with an uncanny stealthiness. Colonel Forsyth took a good look at the situation and decided to defend himself on the little island.

At no place was the Arickaree at that time of the year more than a foot deep. It was the work of but a moment for the soldiers to cross it and intrench themselves, using to best advantage the few bushes and trees that grew on the place. The island was at that time about one hundred yards long and sixty yards wide—an ideal location for the business in hand.

For several hours desultory fighting went on between the scouts and the Indians. The accuracy of the fire being returned from the island let the attackers know that these were no ordinary riflemen, and discouraged rash exposure or careless tactics. A council of war was held among the chiefs and it was decided that Chief Roman Nose should organize and direct the attack.

Roman Nose was an Arapahoe. For some time his tribe had been peaceful, being at one time under the care of the Indian Agent at Ft. Laramie. It was here, possibly, that Roman Nose gained his knowledge of formations and tactics. He was observant and intelligent. He watched closely and studied carefully the maneuvers of the white cavalry. Later, he practiced the movements with his own tribesmen and became a proficient drillmaster with his dexterous subjects.

If we are to believe tradition, Roman Nose possessed what we would now call a magnetic personality. Typically Indian in his pride of bearing, he was a dashing and an inspiring leader. He was described as tall, muscular, very straight, and with a physique of masculine beauty and perfection. In imagination we might picture him as the model for those famous old Western artists who depicted the "Noble Indian."

As Roman Nose arranged his plans and made his preparations there followed a lull in the battle. Colonel Forsyth and Lieutenant Beecher took the opportunity to check up on their losses and prepare for what they felt the sudden quietness of the enemy portended. The gallant Forsyth had been twice wounded and was directing his courageous band from a rough couch that had been hastily prepared for him. Firearms belonging to the dead and wounded were loaded and placed beside the more expert marksmen in the

company. The crude sand intrenchments were strengthened and the scouts settled down grimly to await eventualities.

In a gully out of rifle range from the island, Roman Nose completed his plans. While the main body of the Indians was to conduct a holding engagement, Roman Nose at the head of a selected band of "shock troops" would conduct an assault. For this purpose about three hundred of the finest and best-mounted braves were chosen. Following the example of Roman Nose, these stripped down to breech-clouts and bedecked themselves with their most hideous war-paint and feathers. Roman Nose, painted with alternate stripes of red and black, mounted a superb chestnut horse and took his place at their head. The formation was to be in six mounted ranks, or waves, with a front of about sixty warriors.

With his glasses Forsyth watched the formation of this formidable attack. The closer hills and bluffs were dotted with squaws, children, medicine men, and the noncombatants of the tribes, excitedly awaiting the final charge that was to be, they felt, the annihilation of the hated Whites.

The action started upon the signal of Roman Nose. Instantly the ominous lull was split by fanatical screeches and yells from the hills. A searching and intense fire was directed at the scouts by the braves who supported the attack from positions of concealment nearby. As the charging savages swept down upon the white men they were a fearsome sight. It was a moment of appalling uncertainty, a moment to try the courage of stout hearts; but there were among the scouts men who had, behind the breastworks at Gettysburg, awaited in just such a terrible moment Pickett's desperate charge. Each man picked out his particular Indian, and all aimed coolly. Let Colonel Forsyth describe the charge in his own words:

> . . . . As they neared us Roman Nose drew his body to its full height and shook his clenched fist defiantly at us. Then, throwing back his head and glancing skyward, he suddenly struck the palm of his hand across his mouth and gave tongue to a war-cry that I have never heard equalled in power or intensity. Scarcely had its echoes reached the river's banks when it was caught up by each and every one of the charging warriors with an energy that baffles description, and answered back with blood-curdling yells and exultation and prospective vengeance by the women and children on the river's bluffs. . . . On they came at a swinging gallop, rending the air with their wild war-whoops.

When the rushing cavalcade reached the shallow water-course it was met by a withering fire from the scouts. A good half of the first wave went down. Horses reared frantically. Successive volleys, accurate and deadly, threw the charge into a confused mass of frenzied animals and struggling men. The wounded were trampled into the sand with the dead. The attack had failed, and the disconcerted survivors withdrew. Roman Nose, the idol and the hero of a hundred lodges, had met crushing defeat, and his life's blood was flowing from a fatal wound in the side.

On the hills exultation gave way to rage and grief. The medicine men screamed, the squaws beat the death tom-toms for the warriors whose blood reddened the water that flowed past the bluffs. Several more attacks were made, all half-hearted and unsuccess-

ful, and then darkness came. Through the night the quavering death-cries of the sorrowing mourners of Roman Nose told the crouching Whites that they were still besieged.

Under cover of the darkness Forsyth sent two scouts out with messages to Ft. Wallace for aid. Fortunately they eluded the Indians, and after four days of anxious travelling through country infested with the enemy they reached the fort. From here on the story of the battle reads like the continuity of a wild west movie thriller—the excitement at the fort, the speedy assembly of the troopers, saddling of horses, and the start of the brilliant and forced ride to the rescue.

In the meantime the suffering of the band on the island was extreme. As the days passed it became apparent that the savages intended to starve them into submission. The horses had all been killed, and, as long as it was fresh, the scouts lived on horsemeat. For water they scooped little holes in the sand into which a brackish liquid seeped from the river. A deathly stench filled the air. Buzzards hovered expectantly and with a ghastly idleness over the place. By day the defenders were subjected to a constant fire which, to save ammunition, they were forced to return very sparingly. By night the savages kept up an infernal tumult; their falsetto yells and hideous cries drove the half-delirious wounded almost insane.

On the morning of the ninth day the sunken, glaring eyes of the despairing sentries searched the hills and bluffs with leaping hope. During the night the besiegers had disappeared as stealthily as they had assembled, and the original peace and quiet of the country greeted the dawn. A few hours later a troop of the 10th Cavalry rode into sight of the wildly rejoicing scouts. Tears streamed down the faces of ordinarily unemotional frontiersmen and hardened troopers. The siege was over. More than half of the hardy band had been killed or wounded, and Lieutenant Beecher was among the dead. The Indians had abandoned about seventy-five of their dead, and the approximate number of their casualties has never been determined.

So ended the careers of both Chief Roman Nose, and Lieutenant Beecher, after whom the famous little island has been named. Two leaders had at the same time the same idea—that of studying the enemy's tactics and beating him through the application of one form of the principle of surprise.

Tank Design and Characteristics

A simple statement of the considerations that enter into tank design

MAJ. C. E. SPEER, Infantry

ALL officers who have had any experience with tanks state that any modification or improvement in any tank characteristic will affect the tactical use of that tank.

The ideal tank would obviously be one, armored against any projectile or chemical, which could attack the enemy frontally and destroy him without injury to itself or its crew. Such a vehicle is hardly to be expected for war against a first-class power. However, any well-designed modern tank should be able to deal with troops unsupported by artillery or antitank guns in exactly this manner.

At present the fact must be faced that the ideal tank cannot be constructed because of the impossibility of armoring it against projectiles which can penetrate it and destroy its crew.

This article is an effort to state the problem of designing an efficient combat tank, in the hope that the inventive genius of many individuals will be directed to the subject. There has been great improvement in tank design since the World War and there is reason to expect that many more improvements will be made in the near future.

The following two statements are for the purpose of showing the necessity for proper specifications for tank construction.

1. Tactically the tank adds to the infantry's characteristics of fire and movement, those of crushing power and limited protection. It has the limitations imposed by a limited field of vision and poor communications. These elements vary with the design of any individual model of tank. The combinations of the elements determine the capabilities and limitations of the tank, which we may call its battle mobility.

2. The tactical use of any tank is governed by its characteristics, which are determined by its design.

In order to design an effective combat tank, the following method should be followed. The tactical uses for which the tank is desired should be decided. From these the characteristics necessary to perform these missions should be worked. The tank should then be designed by an expert mechanical engineer to have the characteristics required. If these are impossible to attain, the tactical uses must be modified to meet the characteristics possible of attainment. It should be noted at this point that any tank should be designed to combat a well-equipped enemy, rather than a poorly-equipped or semi-barbarous one.

The characteristics of tanks frequently cause conflicting specifications in design. For this reason some characteristic must be slighted in each model in order to increase some other characteristic which the designer considers more important. It is manifest from this fact that the characteristics will vary with the different models of tanks, and that the tactical uses of the different models will be equally varied. For this reason a single type of tank for all missions is no more feasible than a single artillery piece would be

to perform the varied missions of artillery. In this writer's opinion, at least three types of tanks will be necessary, a light tank, ten to fifteen tons, with four-man crew; a medium tank, twenty to twenty-five tons, with six-man crew; and a heavy tank, forty to fifty tons, with twelve-man crew.

For purposes of tank design, tank chacteristics should be considered in two groups; first, those characteristics that conflict in their requirements for design, and second, those that do not conflict. This arbitrary division into groups has no bearing on the relative tactical importance of the various characteristics, but is only used for convenience in the balancing of the conflicting requirements in design.

Thirteen characteristics to be considered in the first group are: speed, cross-country ability, crushing power, durability, radius of action, armor, armament, field of vision, visibility, communication (exterior), weight, dimensions, and field of fire in all directions.

Ten characteristics to be considered in the second group are: ease of control, ventilation, noise, communication (interior), fire-proof fighting compartment, camouflage, engine position, properly planned and located fighting compartment, more than one door, and proper ports for various purposes.

What are the effects of each characteristic on the tactical use or battle mobility of any tank, and its requirements in design?

FIRST GROUP OF TANK CHARACTERISTICS

1. *Speed.* Speed gives the tank tactical and strategical mobility. It adds to the possibilities of surprise and rapid maneuver in battle.

Speed depends on power of motor, gearing, track design, and to a certain degree on weight. Weight up to twenty tons should not detract from speed. At present a length of at least fifteen or twenty feet seems to be required for speed cross-country if the tank is to cross small shell holes and ditches. Spring suspension adds to speed and reduces the excessive wear caused by it. All tanks should have overpowered motors, as a great deal more power is necessary for speed up hills than on level ground.

2. *Cross-country Ability.* Cross-country ability permits the tank to operate across country and to surmount certain obstacles. It permits the use of tanks against strongly fortified positions.

Cross-country ability depends on the power of the motor, gearing, track design, length, placement of the center of gravity of the tank at its center, and to a slight degree on weight. All tanks must be overpowered to give the necessary ability to cross obstacles at fairly high speed. Spring suspension adds greatly to cross-country ability. The tank's ability to ford streams depends on the height of the exhaust, carburetor, and ignition above the ground. To cross swamps, the track shoe should be solid. The tank can span a little less than half its length. It can climb a vertical obstacle the height of the nose of its track above the ground. This height is attained by means of an overhead track, by designing the lower track support on the arc of a large circle which permits the nose to rock up on encountering an obstacle, and by the use of a spring lever arm on the forward track wheel which also allows the nose to rise on encountering an obstacle.

3. *Crushing Power.* Crushing power permits the use of the tank to crush wire and other light obstacles and thus assist the infantry in surprise attacks on prepared positions. If this power is great enough the tank can crush large trees, machine gun emplacements, field guns, masonry walls, and small buildings.

Crushing power depends on weight, obstacle climbing ability, and design of track. A solid track shoe is best for crushing wire and for ramming walls, trees, and the like. It is to be noted that the pressure per square inch of track surface when the entire track is bearing on the ground is less than that of the human foot, and for this reason the tank cannot be used as a road roller to prepare routes for other wheeled transportation over soft soil or sand.

4. *Durability.* Durability permits the tank to move long distances under its own power and increases the mechanical life of the tank. This effects a saving in other means of transportation, cuts down the repair and maintenance work, greatly increases the radius of action, and, most important of all, raises the permissible weight of the light tank because it makes truck transportation unnecessary.

Durability depends on proper design and lubrication of moving parts of the transmission and track, and on the selection of a rugged and easily cooled motor. Spring suspension lessens the strain on all parts of the tank caused by speed and obstacle climbing, and is essential to durability.

5. *Radius of Action.* Radius of action determines the extent of the area in which the tank can operate, and limits the time that it can remain in action without maintenance or refueling.

Radius of action depends on the mechanical life of the tank and on the fuel supply. After these reach a high standard the physical endurance of the crew may be the limiting factor.

6. *Armor.* Armor determines the weapons against which the tank can operate with safety. In general, the chances of tank success are small if the tank is not armored against the weapons of the enemy's infantry. At present the most effective and dangerous infantry antitank weapons are the .50 caliber machine gun and the 37-mm. gun.

The effectiveness of armor depends on many factors. First, the thickness of steel armor plate can be definitely calculated to stop any projectile, but the weight is usually prohibitive; second, the shape of the armor has much to do with its effectivness, for a projectile that strikes it at an angle will be deflected; third, the use of two or more thicknesses of armor plate with air spaces between them adds to effectiveness, with reduced weight; fourth, the elasticity of the armor or its mounting adds to its power of resistance; fifth, the metal of which the armor is made is obviously of great importance, and perhaps we may evolve a new alloy of lighter weight than steel which will give the required protection. Not only should the armor keep projectiles from penetrating the tank, but it should also prevent the splash of metal from projectiles from coming through the observation slits. The use of bullet-proof glass behind the slits, which the writer suggested upon his return from France in 1926, seems to prevent this splash. Lastly the fighting compart-

ment should be protected from gas and chemicals. This can be accomplished by forcing air into the tank through a gas-proof filter and forcing it out through a slightly smaller filter by means of ventilating fans.

7. *Armament.* Armament determines, together with crushing power, what targets the tank can engage and destroy.

Armament depends entirely on the uses to which the tank is to be put in action. War-time tanks carried the 75-mm., the six-pounder, the 37-mm., and the machine gun, according to their size and type. The British have developed a three-pounder for tank and antitank use. The range during the war had a maximum of six hundred yards because of the limited visibility, and the average range used was about one hundred yards. The British now contemplate firing at twelve hundred yards. Experiment will show whether this range or an even longer one is practicable. If so, heavier guns for tanks will be desirable. The writer's opinion is that all tanks should carry a gun heavy enough to destroy any tank of the enemy's; should also carry machine guns for use against personnel.

8. *Field of Vision.* Field of vision limits the tank in the performance of battle missions. To date the field of vision has been so limited as to prevent the use of the tank for reconnaissance or long range fire on an enemy. It has also complicated the problem of communications.

Field of vision depends mainly on the size of observation slits and the efficiency of periscopes. It also depends on the height of the tank above the ground, for the observer can see more if he is higher. Bullet-proof glass should permit slightly larger observation slits. There is also great room for improvement in the issue periscope.

9. *Communication (exterior).* Exterior communication is at present very poor and practically limits the tank attack to a series of limited objectives, as the tank is out of contact once it is committed to action.

Communication depends on wireless, field of vision, pyrotechnics, pigeons, visual signals, and runners. Flag signals may be used for short distances, but any visual signals are difficult to see from inside a tank. Pigeons can be used from front to rear only. Rocket signals from front to rear are very satisfactory. Runners can be sent from front to rear, and with great difficulty can sometimes operate from the rear forward. Wireless seems to offer great possibilities, but so far no satisfactory set has been devised in America for the control of tanks in action. The British are reported to have been more successful.

10. *Visibility.* Visibility adds to the vulnerability of the tank and in certain situations limits its use.

Visibility depends mainly on the height of the tank, but is also affected by the shape, movement, and color of the tank. Spring suspension and supple track reduce visibility by making the movement of the tank smoother, and by preventing the nose from rising in the air when crossing an obstacle, and exposing the belly of the tank.

11. *Weight.* Weight adds to crushing power. It limits means of transportation and stream crossing. Up to twenty tons, weight should not affect either speed or cross-country ability adversely.

Weight depends on the size of the tank, the thickness of the armor, and the weight of the motor, transmission, fuel, armament, ammunition, crew and supplies.

12. *Dimensions of Length, Height, and Breadth.* Length up to twenty or thirty feet adds to both speed and cross-country ability. Height adds to both field of vision and visibility. Height usually limits cross-country ability and makes difficult accurate fire from guns mounted much above the center of gravity of the tank. Breadth is necessary to give the tank proper proportions. It adds to the visibility. If excessive, it prohibits the transport of the tank on standard-gauge railroads and reduces its ability to pass through woods, defiles, and narrow streets.

Dimensions depend on the desire of the designer, and are limited only by considerations of weight, power of motor, and visibility. It may be noted at this point that no definite limits have been set for the weight of light, medium, or heavy tanks. The American and French light two-man tanks weigh about seven tons; the British light tank weighs ten to twelve tons and carries a crew of four. The American and British heavy tanks weigh about forty tons; the French heavy weighs about eighty tons. There are several models of so-called medium tanks which weigh about twenty tons, and there are some very small vehicles called tankettes.

13. *Fire in all directions.* Fire in all directions enables the crew to engage any target without changing direction, and in addition permits the crew to defend the tank when it is ditched or otherwise halted by any trouble.

Ability to fire in all directions is attained either by mounting one or more guns in a revolving turret, or by mounting guns in all directions. In the writer's opinion it is more satisfactory to mount guns in all directions than to mount them in a revolving turret, for the following reasons: first, fire from a turret is not as accurate as that from guns mounted lower down; second, fire from a turret can be directed in but one direction at a time, and the enemy can see this and act on it; third, the weight of the turret has a tendency to put the tank off balance when crossing an obstacle; fourth, the turret adds to the visibility of the tank; fifth, in the larger models the post of the officer should be in the center, and would conflict with the gun turret unless the officer were the gunner, which does not seem advisable; sixth, the cost and weight of the turret are greater than sponson mounts for several guns in the larger models of tanks.

Without going into technical details, let us consider briefly the conflicting specifications for design caused by the above characteristics.

In order to get high speed with any given motor power it is desirable to reduce the weight of the tank. This reduction of weight can be effected in three ways: first, by reducing the size of the tank, which reduces its spanning and cross-country ability, and also its armament and crushing power; second, by reducing its armor, which, of course, makes it vulnerable to lighter weapons; and, third, by reducing the weight of the track and transmission. Use of an open mesh track usually means reduction of the tank's ability to cross soft ground, and also introduces danger of wire, stones, or other objects fouling the track. Reduction in the weight of

track and transmission lessen durability as a general rule. Due to the weight of the tank there is need for a wide range of gears and a vast reserve of power if the tank is to cross obstacles. In order to achieve speed tanks are frequently geared to make high speed on smooth ground, with the result that they can just creep along, if they can move at all, over rough ground, steep hills, or other obstacles.

The radius of action of the tank depends on its durability and by the amount of fuel that it carries and uses. The durability of all tanks has increased tremendously since the World War and will soon cease to be a factor in limiting the radius of action. The amount of fuel carried will always be a limiting factor. A small tank, of course, uses less fuel than a large one, but is also forced to carry less. Probably a medium tank will give the best economic radius of action.

The fact that armor and armament increase weight is obvious. The only real obstacle to a perfect tank is the present impossibility of armoring it against weapons under whose fire it is bound to operate.

Field of vision and visibility are conflicting is so far as the height of the tank affects them. The higher the observer the more he can see, and the higher the tank the more it can be seen. Field of vision is also restricted by the small size of observation ports, and in this instance its requirements conflict with those of protective armor. Visibility and dimensions must be considered together in order to provide sufficient space for efficient work inside the tank, while presenting a small target to the enemy for observation and fire. Exterior communications are also to a certain extent linked with field of vision.

Weight is often the paramount consideration in design. From the foregoing we see that it is involved in all of the other characteristics. With increased speed, durability, and radius of action, the limitation of the weight to that which can be transported by truck will undoubtedly be removed. This will increase the permissible weight of the tank to ten or twenty tons, and will permit the construction of a much more efficient machine.

Fire in all directions really determines the type of construction to be used in the tank and modifies almost every detail of design. If the turret type is decided on the tank cannot have overhead tracks without prohibitive height. This prevents mounting guns on the sides lower down. If guns are to be mounted in all directions it is possible to use either an overhead track and mount the guns in sponsons or a low track and mount the guns over the track. In the writer's opinion the overhead track is preferable. The location of the turret, if one is used, determines the location of the engine and the weight of armor and armament. The center of gravity of the tank must then be placed near its center by calculating the location of fuel, transmission, and so on, and, if necessary, adding or subtracting armor weight, or moving the turret or armored fuel tanks to get proper balance. The decision to use turret or sponson mounts must be made before the design is started, to permit determination of the size of the tank, the type of armor, and the general dimensions required. To a certain extent the type of track is also governed by this decision.

Having considered the first group of

tank characteristics, and the points in which they cause conflicting requirements in design, let us consider the second group, which is equally important, but which does not conflict with other requirements.

SECOND GROUP OF TANK CHARACTERISTICS

1. *Ease of Control.* Ease of control adds greatly to the maneuvering power of the tank in action and increases its effective radius of action by reducing the fatigue of the crew.

Ease of control depends entirely on proper design of transmission and steering mechanism. All tanks should be designed to be driven by one man. Gear shifting should be as simple as possible. The British seem to have solved this problem of gear shifting by the use of a hydraulic transmission, but of course its design is secret.

2. *Ventilation.* Ventilation is essential not only to the comfort and preservation of the lives of the crew, but also to the proper running of the motor. It will become increasingly important when the fighting compartments are made gas-proof.

Ventilation depends entirely on proper design of air ducts and ventilating fans for any given model of tank.

3. *Noise.* Noise detracts from the use of tanks in surprise attacks, and also makes approach marches dangerous. It has the advantage of terrifying an enemy whose morale is low, but this is certainly outweighed by the disadvantages.

Noise is caused in part by the track and suspension, and in part by the motor. Track noise may be reduced by means of rubber absorbers, proper lubrication, and moving in slow speed. Spring suspension reduces noise. Motor noise can be reduced by placing mufflers in the exhaust, and by causing the motor to run smoothly without backfiring. An overpowered motor helps, as any motor will be noisy if run under a strain.

4. *Communication (interior).* Interior communication adds greatly to the transmission of orders and information, and thus adds to the efficiency of the crew in action.

Interior communication can be well taken care of by a larynx button telephone set similar to that installed in our Mark VIII tank.

5. *Fireproof Fighting Compartment.* A fireproof fighting compartment adds greatly to the efficiency of the crew by removing the necessity for fire fighting. It also reduces casualties.

Danger of fire from the motor is largely eliminated by avoiding pressure feed of gasoline, and thereby preventing a supply of fuel to any fire that may start. Danger of fire from a projectile is avoided by placing the fuel tanks and their armor in such a position that they can be cut off from the fighting compartment in case of fire.

6. *Engine Position.* The motor should be aft, for the following reasons: first, the driver can see the foreground better than he can if his view is obstructed by the motor and its armor; second, the motor is in a more protected position aft than forward; third, in the event of motor trouble the mechanic can make repairs without interfering with the firing of other members of the crew; fourth, heat and gases from the motor do not enter the fighting compartment and weaken and annoy the crew; fifth, the distance

from motor to track drive wheel is shorter, and hence the transmission machinery is lighter and presents less difficulty of design; sixth, the tank is usually more heavily armored in front than in rear, and placing the motor aft makes it easier to place the center of gravity of the tank near its center. In the writer's opinion the engine should always be accessible from the fighting compartment in order that repairs may be made during action without leaving the tank.

7. *Camouflage.* Camouflage is essential to the operation of tanks in forward battle areas.

Camouflage depends largely on the efforts of the crew, but the designer should make certain provisions. The shape of the tank must be such as not to attract undue attention; the tank should be provided with brackets for supporting camouflage nets; some arrangement should be made whereby the tank can emit smoke clouds; and some means of erasing tank tracks by dragging a harrow or similar tool behind the tank should be devised.

8. *Properly Located and Planned Fighting Compartment.* The fighting compartment should be low, with machine guns mounted forward and heavy guns in sponson mounts amidships. It is also desirable to have a gun mounted to the rear. This gun will usually have to be mounted higher than the others to fire over the engine room. Proper planning means that every effort should be made to ensure the smooth working of the crew in battle. All men should be in touch with the tank commander; ammunition should be placed adjacent to guns, so that gun crews will not interfere with each other; light, ventilation, and observation should be properly coordinated; brackets should be provided for equipment; tools, instruments, and equipment should be cut to a minimum, as the tank is crowded at best and unnecessary crowding of the crew adds greatly to their fatigue. In this matter of making the fighting compartment shipshape, the study of the design of naval gun turrets and some of the early tanks designed by naval experts will be of great help.

9. *More Than One Door.* A tank should have two or more doors on opposite sides, to permit entrance or exit under fire in action or rapid evacuation of the tank in the event of fire or ditching.

10. *Proper Ports.* Proper ports should be cut in the armor for observation, firing pistols, discharging pyrotechnic signals, displaying signal flags, using periscopes, throwing out bad ammunition and the like. This means that the ports should be in the proper place and be of the proper size for the use for which they are intended.

All of the above characteristics must be considered in the design of any tank, regardless of its size and weight. To date no tank has been designed which does not slight some characteristics very greatly. Armor, field of vision, communication (exterior), and proper gun mounting are neglected in most models. The following general description of an effective combat tank is offered as an example of what should be possible if present good features of several tanks were combined.

An efficient combat tank should be able to make high speed (twenty or thirty miles per hour) over fairly rough ground (75-mm. shell holes and ordinary trenches). It should have suffi-

cient obstacle-crossing ability to penetrate the ordinary trench system, and sufficient crushing power to crush wire and small guns. Its armor should protect its crew from gas and the projectiles of guns under whose fire it is certain to operate (.50 caliber machine gun and 37-mm. gun). It should carry heavy enough guns to destroy another tank (three or six pounders). It should have a good field of vision and be capable of fire in all directions. It should be easy to control, and comfortable to ride in. Its motor should be powerful, flexible, easily cooled, and economical to operate. Air-cooled motors, electric motors, and Diesel motors all have great possibilities for tanks. The weight will be governed by the size of the tank, but any tank up to twenty tons should be able to move long distances under its own power, because of the increased durability of tractor-driven vehicles.

Finally, the tank designer must look to the future, and design a tank to compete with a first-class power, equipped with effective antitank guns and with guns capable of combating other tanks. He must not limit his efforts to designing a vehicle for use against a poorly equipped infantry in the open. The light tank, having limited cross-country ability, being armored only against rifle fire, and being armed only with a machine gun for use against personnel, will have a very limited use in a war with a first-class power.

Competition developed the airplane. Perhaps a clear understanding of the needs of tanks will stimulate the interest of persons whose inventive genius will aid in solving the technical problems of their design. Each improvement in design means an improvement in some characteristic, and thus widens the opportunities for tactical use of the tank. Increased use of the tank means reduced use of personnel and consequent reduction of suffering and loss of life for our Army in any future war.

Some Practical Aspects of Antiaircraft Rifle Practice

CAPT. SIDNEY H. NEGROTTO, Infantry

RIFLE fire against airplanes is of such recent origin, and we know so little of what its probable effect will be in time of war, that one searches in vain for a suitable criteria on which to base training procedure.

During the World War there was some individual rifle shooting at hostile airplanes, more as a matter of sportsmanship than as a studied or trained effort to inflict damage. There is no record of the rifle ever having inflicted any damage on hostile planes. But machine gun units, after having received some more or less indifferent training in antiaircraft fire, accounted for some hits—a part of them on the large number of friendly planes that were engaged by mistake. The artillery was more fortunate. Immediately on the outbreak of the war the French began to study methods of dealing with air attacks, and as early as May, 1916, the school of fire at Arnouville published very comprehensive regulations embodying a sound technique of antiaircraft fire for the 75-mm. gun. But in spite of the soundness of the doctrine, it has been estimated that in 1918 it took three thousand rounds to secure one hit, while in 1916 it had taken ten thousand, in 1914, one hundred thousand rounds. But the rifle, because of its small calibre and perhaps because of its traditional use against personnel only, was never considered an effective weapon against low-flying aircraft.

The limitations of the rifle against aerial targets must be fully appreciated lest we be lulled into a sense of false security. The most that we can hope to do with it is to keep the attacking planes out of range of effective fire; and even though we develop our technique of fire to such high efficiency as to make the flyers cautious, there always will be daring ones who will disregard the ordinary rules of safety and approach the attacking troops to within a few hundred feet, because it is only such daring that achieves decisive results. Boldness will ever go with victory, and aviators will use it to inflict damages on the enemy even more skillfully than did the outstanding cavalry leaders of our Civil War. Though the rifle will always be a weapon for use essentially against ground troops, there are many conceivable situations involving air attacks against ground troops in which the fire-power of a single company, judiciously used, might well be decisive.

The obvious object of antiaircraft rifle fire is to destroy or damage low-flying aircraft and thus break up the air attack. This can be accomplished by a large volume of accurate fire, rapidly delivered so as to produce the greatest possible number of hits in the brief time that the target is within the effective rifle range. But good results will follow only from the application of correct training methods and doctrines that have been evolved from experience under varying circumstances

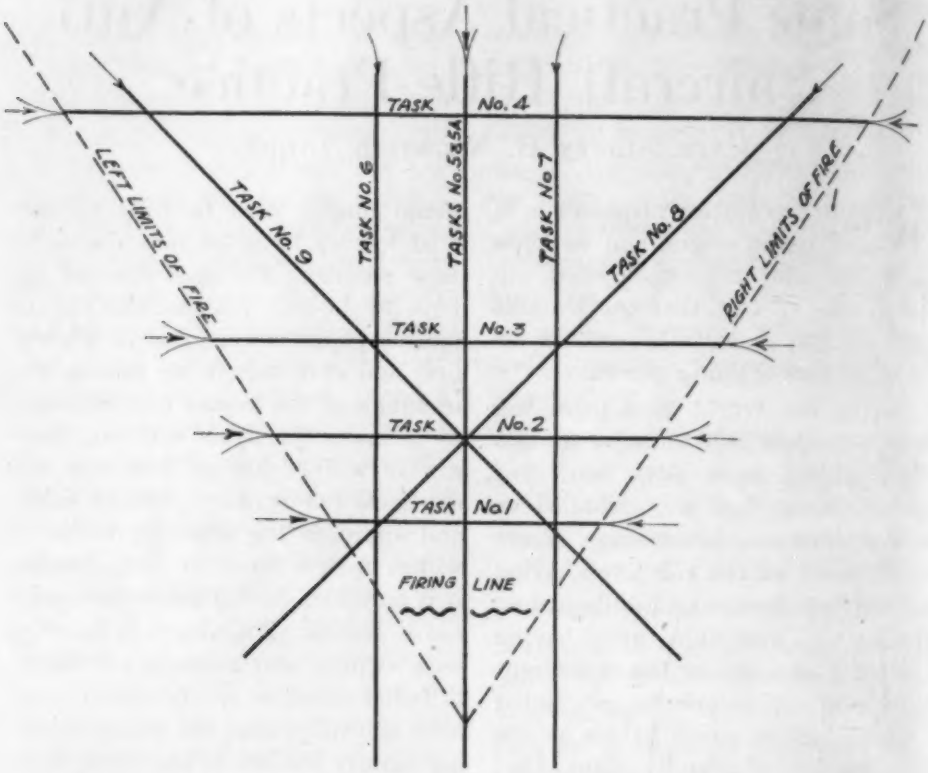


Diagram Showing the Courses to Be Flown by an Airplane for Antiaircraft Rifle Practice

and conditions over a long period of time. A single set of observations can not lead to correct conclusions. A large amount of firing is necessary, and the results of all such firing must be carefully analyzed and evaluated. The firing the infantry regiments are now doing will be of great value in formulating service doctrines. Existing instructions require reports to corps area commanders of all firing of the regiments. These reports will eventually reach the office of the Chief of Infantry, where they will be studied in connection with other available data, for the purpose of establishing training doctrines and standards of proficiency.

Therefore, with a view of suggesting a uniform procedure for firing at towed targets that may serve as a guide until such procedure is embodied in training regulations, this article, based on the writer's own experience, is prepared for such use as it may serve.

ANTIAIRCRAFT RIFLE PRACTICE

Antiaircraft rifle practice not only demands a thorough preparation of all details connected with sleeve target firing, but calls for the closest cooperation between the pilot of the airplane and the officer in charge of the firing. It should not be undertaken until the group is thoroughly trained in all of the preliminaries of antiaircraft marksmanship.

As soon as the sub-caliber range fir-

ing is completed the class should be instructed in:

1. The flight and attack characteristics of the different types of aircraft.
2. Rifle fire dispersion. Bearing in mind that the dispersion of rifle fire directed at a rapidly moving target is not only considerably greater but also different in pattern from the dispersion on ground targets (exact data on this are not yet available).
3. The characteristics of the trajectory.
4. Estimating ranges to and speed of airplanes.[1] Estimated ranges should be compared with computed ranges whenever possible.
5. Dry shooting with the Antiaircraft Aim Recording Device[2], or some exercises of a similar nature.
6. The preparation of lead tables. Taking into account the personal error.
7. The characteristics of tracer ammunition[3].
8. The observance of safety precautions.

How this training will be carried out will depend largely on the ingenuity and resourcefulness of the instructor. Its importance, however, is vital; it is to sleeve target firing what preparatory training is to rifle marksmanship. The thoroughness with which it is carried out will more than pay for itself in the large number of hits that will be made on the sleeve targets. In this connection, the writer has had the opportunity of making a cursory study of the results of firing done at three different stations (exclusive of firing that he himself has done) and the one station that carried out in general only a part of the above suggested instructions made an enviable number of hits at the close ranges, with slightly more than one per cent of hits at one thousand yards slant range; while at the other two stations the firing at towed targets followed the subcaliber range firing without any intervening instructions, with the result that only a few hits were made at the close ranges and no hits at the long ones.

It must be borne in mind that fire should be opened on hostile planes at the extreme ranges in order to keep them away from their objective. This means that we are working at the point of greatest dispersion and fewest probable hits. For this reason it is necessary that troops be trained to open fire at ranges as great as two thousand yards, certainly at fifteen hundred yards.

While War Department instructions have authorized firing at towed targets, Training Regulations 300-5 do not prescribe the amount nor the kind of firing to be done; nor do they give any details of how this all-important phase of antiaircraft practice is to be carried out. This is rightly left in the hands of regimental commanders, who can have experience with troops under varied conditions. But some tentative guide or basis for this kind of firing is essential in order that the firing done may be of general value in formulating a standard of proficiency.

What course of firing then will afford the maximum amount of training and at the same time be suitable for determining the proficiency of the unit? The answer to this question will be governed largely by air tactics and

[1] See page 11 INFANTRY JOURNAL, January, 1930.
[2] See page 229 INFANTRY JOURNAL, September, 1929.
[3] See page 231 INFANTRY JOURNAL, September, 1929.

infantry formations. Air tactics, on the one hand, will be such as to inflict the greatest possible damage on ground troops; while infantry, on the other hand, will retaliate by adopting formations that will decrease its vulnerability and from which it can immediately open effective fire on the attacking aircraft. Present air tactics demand that infantry be trained to open concentrated fire as soon as the airplanes enter effective rifle range, and at whatever angle of approach, altitude, speed, or course the target may be. For all practical purposes we may assume that the speed, course, and altitude will remain constant for at least a short time.

The following basic scheme of procedure for conducting antiaircraft rifle practice at sleeve targets is recommended:

1. *For record firings.* Firing of all the tasks as shown in the following table whenever practicable, and in any even tasks 1, 4, 5, and 8.

   Ammunition. All tracer or a mixture of tracer and ball in the proportion one to two.

   Sight setting. Battle sight for all tasks except No. 4, for which use open sight set at one thousand yards.

   Rate of fire. As rapid as possible, consistent with good shooting.

   Personnel. One war strength rifle section, one officer in charge of firing, two statistical officers.

   Firing position. Standing or modified kneeling, without slings or rests of any kind.

2. *For combat practice.* Any four of the tasks given in the table, at the selection of the pilot and unknown to the firing line.

The accompanying table is best understood by reference to the diagram. The sector of fire will vary from sixty to ninety degrees according to the limits of safety imposed by camp or post commanders. A sector of ninety degrees would be ideal but rarely will it be possible to secure such a large field of fire. Sixty degrees is sufficient for all practical purposes. The various tasks are indicated by the heavy black lines while the direction of approach in each case is shown by arrows.

While it is desirable for each unit to fire all ten tasks, it will at many stations not be possible to secure the services of an airplane for such an extended mission. The ten tasks require a total of five flying hours, exclusive of the time for the plane to fly from its station to the field and time lost due to targets being shot down. If all ten tasks are fired, tasks 1 to 5 should be on the first day, and tasks 5A to 9 on the second. When it is not prac-

TABLE FOR A TARGET PRACTICE COURSE FOR ANTIAIRCRAFT RIFLE PRACTICE

Task No.	*Angle of approach*	*Approximate slant range*	*Altitude*	*No. of runs*	*Course*	*Speed*
1	90 degree	100 yds.	300 ft.	4	Straight	80-125 mph.
2	90 "	300 "	600 "	4	"	do
3	90 "	500 "	1500 "	4	"	do
4	90 "	1000 "	3000 "	4	"	do
5	zero	variable[1]	300 "	4	"	do
5A	"	do	1000 to 200 ft.	4	diving	do
6	"	do	3000 to 300 ft.	4	"	do
7	"	do	300 to 3000 ft.	4	ascending	do
8	45 degree	do	1500 to 150 ft.	4	diving	do
9	45 "	do	150 to 1500 ft.	4	ascending	do

[1] Fire should be opened at fifteen hundred yards for tasks 5, 5A, 6, 7, 8 and 9, and continued as long as the target is in the firing zone.

ticable to fire all tasks, then tasks 1, 4, 5, and 8 are recommended.

AIR MISSIONS

Air missions for sleeve target firing should consist of a number of specific tasks. For each task the direction of approach with respect to the firing line, speed, course, altitude, and number of runs must be prescribed. Also, the pilot should be given a map of the firing area on which the limits of fire and each task are carefully plotted and from which the pilot can select prominent ground features or special markers on which to base his directions. A "zero hour" should be fixed and the pilot informed about dropping the targets after the firing of each task. All of these arrangements must be made in consultation between the pilot and the officer in charge of firing before the day of firing, as ground signals are unsatisfactory. It is desirable that regimental commanders indicate in writing to the pilot what courses he is to fly for the particular practice.

The air missions given in the table limit the pilot to fixed course, altitude, and speed. While it is desirable that the tow target simulate as closely as possible the actions of an enemy's plane in order that no false ideas may grow up in the Infantry as to the correct employment of aircraft, it must be remembered that our record practice must be such as to give us a suitable measure of proficiency of the units that do the firing. The ideal mission should call for about seventy-five per cent of the runs at a fixed altitude and over a fixed course, and twenty-five per cent at altitudes and at angles of approach unknown to the firing line. These latter runs are to simulate battle conditions. But here again it must be remembered that the drag of the target limits the speed and maneuver ability of the plane, and that the target does not conform accurately to the tow plane. Due to the inertia of the long towing cable, the maneuvers of the sleeve are limited to about one-third of that of the towing plane.

The air missions for combat practice should allow the pilot considerable latitude in order that he may simulate as closely as possible the correct methods of attack. This, it is believed, he can do by a judicious selection of several of the tasks given in the table. He might even be permitted to vary these tasks as to course, speed, and altitude, just so long as he keeps within the range of the rifle fire and the limits prescribed for firing.

The type of target is very important. While there is no particular target prescribed for antiaircraft rifle fire, there are several types being tested at Aberdeen Proving Grounds to determine their suitability for machine gun and 37-mm gun firing. Of the various types being tested, it is believed that the B-9 type is the most suitable for rifle fire. It is a cigar-shaped sleeve, thirty feet long, five feet in diameter at its widest point, and three feet in diameter at its mouth. It is closed at the tail and has a non-flexible metal hoop in its mouth. It rides fully inflated and only slightly below the level of the towing plane. It is deep-red in color and shows up very plainly in almost any kind of light. As a result of numerous tests it was found to be the most suitable target for machine gun firing.

A twelve-hundred foot standard tow-line should be used for all parallel and oblique courses, and for all per-

pendicular flights (angles of approach equal to zero) a three thousand-foot tow-line.

The target is scored by counting the number of holes in the target and dividing this number by two. While every bullet does not make two holes in the target, the score thus arrived at is sufficiently accurate for practical purposes.

In order that all firing at sleeve targets may be of value to the entire service it is recommended that the following data be recorded for each task:

1. Number of rounds fired and kind of ammunition used.
2. Number of hits.
3. Average calculated range to targets in parallel flight when the targets are nearest the firing line, and for all other flights the ranges when fire is opened and fire ceases.
4. Number of leads used.
5. Number of rifles and automatic rifles in the firing line.
6. Time required for each task.
7. Size of targets used.

These data should be carefully studied and analyzed to determine whether the actual number of hits compares favorably with the expected or probable number. In the event that the former falls below the latter, the causes for such failure will be either that the announced lead was incorrectly estimated or that the firing line failed to estimate correctly the number of leads as announced, or that there was combination of both. In any event, the source of error is located and corrective measures applied.

As a basis of determining the probable number of hits on aerial targets, we assume the fifty per cent pattern of dispersion to be an ellipse with dimensions as shown for ranges as follows:

Slant range	*Height (Short axis)*	*Width (Long axis)*
100 yards	6 feet	18 feet
300 yards	12 feet	36 feet
500 yards	16 feet	48 feet
1000 yards	25 feet	75 feet

These dimensions are only estimated, as there are no available data on the dispersion of rifle fire at aerial targets. But they are probably accurate enough to form a basis for computing probable results for further study of antiaircraft rifle fire.

American Monuments in Venezuela

MAJ. C. A. WILLOUGHBY, Infantry

IN the still, shady park of Maracay, the capital of Aragua on the shores of Lake Valencia in Venezuela, there is a monument erected in honor of ten Americans who ended their lives on a Venezuelan scaffold. Few of their countrymen know this incident; yet this small group of martyrs was the spark that started the wildfire of a revolution. The Venezuelans have never forgotten these first victims of their struggle for independence.

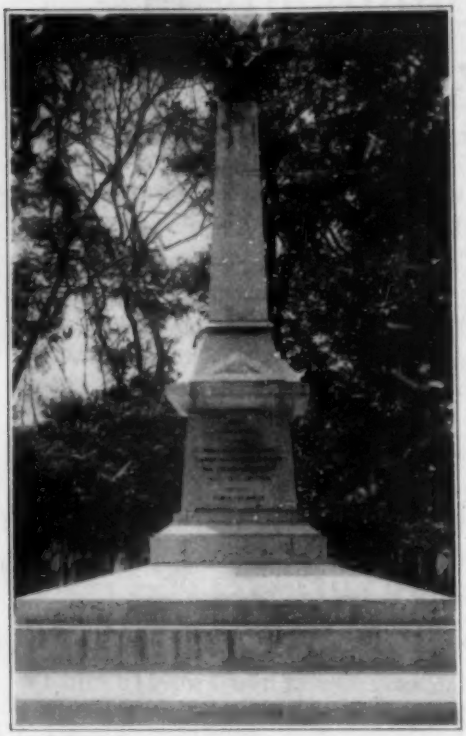
In December, 1805, Commodore Lewis, a captain in the Santo Domingo trade, left New York with two armed ships, the *Emperor* and the *Indostan*. It was vaguely known that Ogden, a wealthy Boston merchant, Colonel Smith, the surveyor of the Port of New York, and Francisco Miranda, a Venezuelan patriot, had something to do with the mysterious sailing.

A little later, another ship, the *Leander*, aroused the gossipy curiosity of the idlers of the water front. Several thousand pikes, two thousand swords and cutlasses, muskets, kegs of powder, and bales of clothing and accoutrements were carried on board. An air of secrecy and mystery pervaded this vessel also. Fink, a butcher of Bowery Lane, and other agents quietly signed up a number of recruits from the neighborhood. There were boys and young men and some who looked as if they had seen military service and some who did not care what became of them. The captain's manifest showed miscellaneous merchandise; the military stores had been omitted. After the loading was completed, the ship dropped some distance down the river. In the dawn of a misty February morning several boats drifted noiselessly toward her and about two hundred men went on board. On February 2, 1806, the *Leander* put to sea.

The *Leander* may have been a mystery to many people but not to the minister of Spain. Within twenty-four hours a pilot boat from Philadelphia speed on its way to the captain general of Caracas. Other messages were hurried off to the governor of Vera Cruz, the viceroy of New Spain, the governor of the Floridas, and the Marquis de Casa Calvo.

The minister knew that the object of this mysterious journey was an attack on some part of the Spanish-American colonies as a prelude to a general uprising, and that the ships had been fitted out by Francisco Miranda, a Venezuelan patriot who had served in the French army in the American revolution and who longed to see his own and other South American countries independent. For years he had wandered from one European court to another, holding at one time an important position in the French army, seeking help in vain, now encouraged, now deluded by vain promises, and always watched by the spies of Spain. Despairing of help from any nation, and aided by Smith and Ogden, he was about to make the attempt on his own account.

After the *Leander* had been several days at sea, Miranda showed himself



The Monument at Maracay, Venezuela, in memory of the American officers who died in the Expedition of Francisco Miranda in 1806

on deck. The one-time lieutenant general of the armies of France looked upon his motley crew, and the group of unsophisticated young adventurers looked back at the man who was to toy with their destinies.

Biggs, one of his followers, says of him: "His limbs are well proportioned; his whole frame is stout and active. Upon the whole, without saying he is an elegant, we may pronounce him a handsome man. He is a courtier and gentleman in his manners. He appears conversant on all subjects."

The brilliant Venezuelan quickly established himself with his motley crew. He entertained the brighter minds with clever dissertations on literature and politics; he charmed the others with a jovial camaraderie and the vague reputation of past glory on the battlefields of Europe.

At last the *Leander* reached Jacquemal, Santo Domingo. Here she was to be joined by the *Emperor* and the *Indostan*. Commodore Lewis, however, the hard-headed Boston sea captain in command, had heard of the diplomatic complications in the wake of the enterprise. The noise of the protest of the Spanish minister in Washington reached as far as Jacquemal, and the prudent Lewis quit. The United States authorities, in the meantime, had proceeded to the trial of Ogden and Smith for "flagrant breach of neutrality laws."

After dallying for a month, Miranda procured two small schooners, the *Bachus* and the *Bee*, and transferred to them about thirty-six of the men. They were most uncomfortable and fell into a state bordering on mutiny. After missing Bonaire, which was their destination, the ships arrived at Aruba on April 11. The troops disembarked, drilled, and put on uniforms and equipment. On April 16, the squadron left Aruba for Ocumare de la Costa.

In the meantime, the Spanish authorities from Cartagena to Cumana were on the lookout and prepared to receive the enemy. The guarda costas were particularly vigilant.

On the night of April 27 the ships were off the port of Puerto Cabello. The lights of the town were gleaming faintly in the distance. The *Leander* had drifted away from the small schooners. Not a light was visible on board these vessels. The seamanship which missed Bonaire by seventy miles could not have been of the best. The *Bachus* and the *Bee* ran squarely into two Spanish guarda costas. The

Spaniards attacked the little vessels promptly. With the noise of the combat, the flashes of musketry, and the yells of men in danger, the *Leander* vanished into the night—when she could have rammed the coast guards and cut them in two.

Miranda had planned this enterprise for thirty years, but at the critical moment he failed.

In spite of their growling and dissatisfaction, their mutterings of mutiny, the handful of Americans on board the schooner fought with grim courage. It was a losing fight. They were outnumbered; they were boarded from two sides. All of them were wounded. They were plundered, bound, and thrown into the dismal dungeon of San Felipe, in the harbor of Puerto Cabello. There they lay wounded and suffering, in dim cellars, with water dripping from mildewed walls, in the stench of filth and decay.

The captured adventurers were tried before a merciless Spanish tribunal. The charge was "piracy, rebellion, and murder" (a number of Spaniards had been killed in the fight). Ten of the prisoners were condemned to death by hanging; the others, forty-four, to prison terms from eight to ten years in the terrible dungeons of Cartagena of Porto Rico. The men condemned to death were executed in a cruel and barbarous fashion. Their heads were cut off and stuck on poles, to be exposed in La Guayra, Caracas, Valencia, and Puerto Cabello.

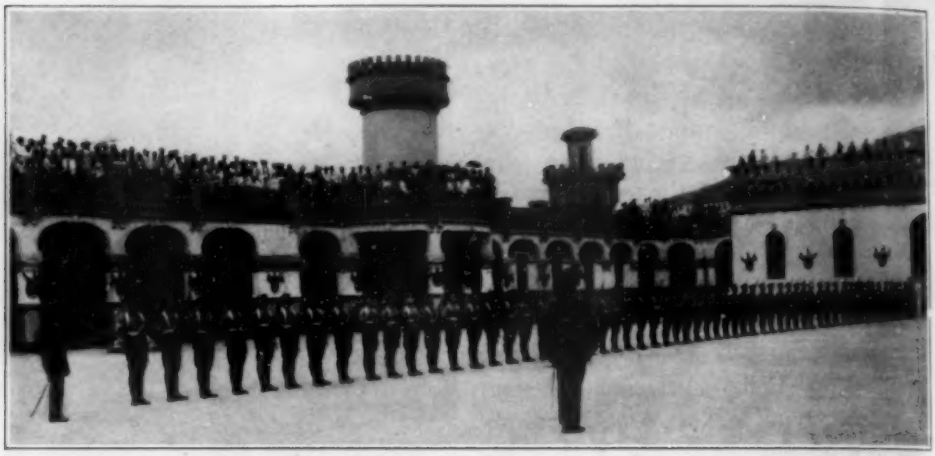
Most of the other prisoners perished. Miserably wounded, ill-nourished, maltreated, they pined away in unhealthy medieval dungeons. A few escaped with the aid of Capt. Thomas Sanford.

The English government, in the traditional policy which is its pride and strength, promptly stepped in where its subjects were concerned and forced the release of three men. By 1810, the other survivors were released, due to the efforts of a merchant of Cartagena.

The Monument to Americans in Puerto Cabello
(Erected during the Presidency of General Crespo)

Time swept over the graves of the American soldiers. The monotony of the years effaced their memory. Their own countrymen had abandoned them; the young adventurers seemed to be forgotten. But the Venezuelans did not forget; and, with independence attained, they carved the names of these martyrs to their cause in enduring stone.

Perhaps these Americans were not of the finest of their country, perhaps



Exhibition Drill of the Cadets at the Military Academy, Caracas, Venezuela

there was a sprinkling of the thoughtless and the adventurous—yet it was a drop of American blood on an alien soil; children of Boston and New York had perished on a foreign shore.

The monument erected to these men is a simple shaft of grey marble, crowned by a bronze eagle. On one side is the coat-of-arms of the United States. At the base of the monument is a tablet with the following names:

Capitán
Thomas Donohue

Tenientes

Thomas Hillop	Paul J. George
James Gardner	Daniel Kemper
Gustavus Burgond	Miles F. Hall
Charles Johnson	John Ferris

Subteniente
Francis Farquharson

Maracay has been the favorite residence of Venezuelan presidents—Paez, the Llanero, Crespo, and Gomez. Perhaps these warriors feel freer in the broad valley of Aragua than in the narrow streets of Caracas.

The small town is scrupulously clean; the hand of official favor has been a marked benefit; the streets are well paved in concrete; the houses are a bit monotonous, as if designed by rule, but look prosperous and well kept.

The presidential mansion, an old colonial building, is in front of the little plaza and faces the monument to the Americans; the coat-of-arms of the Republic of the North looks at the banner of Venezuela.

I remember my first visit to Maracay. I walked slowly through the silent streets; the sun was blinding. It was very still; few persons go about in the heat of the tropical midday. I turned a corner. A sentinel stood sleepily in the shadow of an archway. The little park looked green and inviting. The thin shaft of a grey monument gleamed through the maze of silhouetted branches. I stepped closer and saw the eagle of Washington and, on the base of the monument, a list of American names.

I did not know the history of these Anglo-Saxon names. It was a great surprise. I was a thousand miles from the coast of the United States and here, in the heart of Aragua, in the

shadow of tropical palms, this monument to the sons of Boston and New York was like the friendly hand of a countryman in a strange land.

The monument was erected during the administration of the late General Andrade, a great friend of the United States. The shaft brings to mind the Guyana boundary dispute, when the traditional friendship of the United States for Venezuela became reaffirmed in a critical international controversy.

A similar monument was then erected in the port of Puerto Cabello, where the Americans were tried and confined. This monument is a handsome bronze column also crowned by a heraldic eagle. On one side of the granite base, the coat-of-arms of Venezuela and the United States are united; on the other side there is a wreath of laurel and a palm, and the inscription:

The Gratitude of a Nation
consecrates this Monument on
July 4th, 1896
under the Presidency of the
Republic of General Joaquin
Crespo

On the eastern side of the monument is a tablet with the names of the American soldiers and the following dedication:

To the memory of the North American Citizens, companions and subalterns of General Francisco Miranda, who offered their lives in sacrifice to the Independence of Venezuela on July 21, 1806.

These are not the only monuments to Americans. In the capital of Venezuela, Caracas, in the handsome residential section, the so-called Paraiso, there is a statue of Washington. It has long been a courteous custom for the president of the republic to deposit a wreath at the base of this monument on July 4 of each year.

The Training of the Infantry Team[1]

Individual Training

CAPT. JOSEPH L. TUPPER, 24th Infantry,
and
1ST LIEUT. JOSEPH I. GREENE, 24th Infantry.

WHEN the members of the Infantry Team squad received their equipment, preliminary instruction began without delay. This work followed, with a few slight variations, the course laid down in TR 150-5. When the work did deviate from prescribed methods it was largely because of the special conditions under which an infantry team trains and the special needs which this training brings out.

In order from the very beginning to center the shooters' minds upon the true foundations of marksmanship, all of them were required to cover the preliminary steps. Experience or known ability excused no one. Veteran team shots and greenest tyros alike began with the sighting-bar and went through the whole preliminary training.

THE SIGHT PICTURE

In aiming only the six o'clock hold was permitted. The instructors placed much emphasis upon the formation by the firers of a "sight picture," which would become habitual and unchangeable for all. In a brief lecture the Team Captain brought out the reasons for this ironclad rule. He impressed the candidates with the need for making not only the aiming but every act of firing correct and unvarying habit.

To form the correct sight picture the squad members were told to focus upon the front sight in aiming. This is a departure from the method of the training regulations. The coaches believed that a rifleman can obtain clearer definition of aim, and consequently greater accuracy, by placing the clearly seen front sight against the target below an indistinct bull's-eye, rather than by placing a distinct bull upon a blurred front sight. Although contrary to the usual teaching, the course adopted, stressing as it did the proper relationship of the four elements of aiming, the eye, the two sights, and the target, has given continuously the better results. That this method is both logical and practical will be more apparent a little later when we reach the subject of positions.

CIRCLING THE BULL'S-EYE

Clear definition was also obtained by requiring the shooters to circle the

[1] The second article of a series that began in the INFANTRY JOURNAL for December, 1929.

In addition to Capt. J. P. Lyons, mentioned in the first article of this series, as an assistant coach, there were five other section leaders who assisted in training the Infantry team. These five are: Capt. K. L. Berry, Capt. H. L. Griswold, Capt. M. P. Broderick, 1st Lieut. S. R. Hinds, and 1st Lieut. K. Maertens.

In addition there were five other Infantrymen who worked as assistant coaches at various times. They are: Capt. G. B. Norris, First Sergeant Mollerstrom, First Sergeant Hackala, Sergeant Bissenden and Sergeant Pilat.

bull's-eye with the aiming eye in taking aim, or, in other words, to follow the circumference of the bull completely around. This insured that when he had placed his front sight against the bull, the firer would habitually check up to see that the bull was round rather than lop-sided, and consequently that the top of his front sight was tangent to the bull rather than in it. This probably required a momentary shifting of the focus to the bull's-eye from the front sight.

As each man perfected himself in repeatedly obtaining the correct sight picture, his coaches told him to study and compare in his mind this picture as seen under different conditions of light and weather. This naturally led to the acquisition of accurate correction data for the light and weather variations encountered. Furthermore, the coaches insisted throughout the training course that each man precede every range or score fired by three or four dry shots. This habit made each shooter certain of his sight picture before he fired a shot. Underlying this instruction was also the fact that the greatest deviations from the correct habitual sight picture usually occur in the first few shots fired. Such deviations, of course, are present to a slight degree in the aiming of even the finest shots and cannot be entirely eliminated.

TRIANGLE WORK

The making of aiming groups at two hundred yards followed the sighting-bar work. The standard of excellence set for this work was high—a triangle the size of a man's thumbnail, which is about half as large as the aiming group required by Training Regulation 150-5. This work brought out the cases of poor eyesight among the candidates. Those who failed to make triangles small enough received a careful checking up. When it was definitely found that they were unable to perform this work they were, of course, dropped from the squad.

During the whole training period the coaches often found it necessary to revert to these two elementary instruction phases, the sighting-bar and the making of triangles. Whenever the scoregraph of a firer indicated a slump, that man received at once a refresher course in preliminary instruction.

POSITIONS

Following again the usual order of instruction, practice in assuming the three required firing positions, prone, sitting, and standing, came next. The instruction for the sitting and prone positions deviated very slightly from Training Regulations 150-5, but for the standing position was at considerable variance. During all position work coaches held in mind always and emphasized frequently the close relationship between aiming and position, and the dependence of the first upon the second. In aiming, as stated above, there are four physical elements, the eye, the front and rear sights, and the target. The primary requirement of a good position is that it assures a maximum steadiness of the eye and the sights so that these three elements can be aligned upon the fourth—the target—in correct aim. Thus it is evident that if a position can satisfy in the affirmative the question, "Is the aim good?", then that position also is good.

The first requisite to a good position is, as we have seen, the fixing of the

two sights and the eye in firm alignment. Infantry Team coaches accomplished this by requiring their squad members to rest their heads solidly against the stock. Here the thumb, which to some shooters is a worse than useless appendage to the trigger hand, came into its proper usefulness. The thumb was kept over the stock and used as a comb upon which to rest the cheekbone firmly. The thumb in this manner serves as a rigid point of support for the head, and after the firer forms the habit of its use, the thumb also assures the proper replacing of the head in both slow and rapid fire. Some firers experienced a slight soreness of the cheekbone for the first few days of firing but this soon wore off. The firm contact between cheek and thumb proved moreover to be an actual protection to the face and lip of the firer. Once the shooter understands the correct way to place eye and sights solidly in line, it remains only for him to assume a position in which these three points are aligned upon the target.

But before we discuss the sling positions in detail let us first consider the instruction in the use of the sling. This differed only a little from training regulations. More thought was given than usual to getting the best use out of this aid to steadiness, without, however, exaggerating its importance. The coaches, in fact, required all squad members to use slings a little loose rather than tight. A taut sling interferes with comfort and relaxation in shooting and it causes the right elbow to jump up and to move to the left in prone rapid fire. These points were definitely proved by careful observation of scores of men on the firing line. The sling adjustment is of course largely a personal problem, and it had to be solved by each firer for himself, with the coaches' assistance.

THE PRONE POSITION

In the prone position the firer is steadiest. This fact enables him to form sight pictures with little difficulty. It is important to get a good prone position before any work in other positions is begun. The Infantry Team coaches followed this principle. In the prone instruction they emphasized, in particular, the condition of the ground on the firing line, insisting that squad members never fire from ground which sloped toward the target, or from irregular ground. Any bumpiness or sloping to the fore is sure to cause a cramped or strained position, with consequent difficulty in breathing, interference with circulation, and unsteadiness of heart action. In a good prone position the elbows should be on the highest ground so that the chest is drawn well up and the diaphragm free for natural breathing. When the ground is satisfactory the firer should have no difficulty in relaxing comfortably and "lying down upon his piece." Only when this muscular ease is assured, and the very minimum of effort in holding, aiming, and firing is also certain, can the firer be expected to obtain habitually and precisely his correct sight picture. A special detail which the prone position training brought out was the need for small men to lie at a greater angle than forty-five degrees to their pieces. About sixty degrees seemed to give the best results.

THE SITTING POSITION

In the beginning of the sitting position instruction no change from the prescribed position was authorized.

Coaches did not allow any deviation at all for the first two weeks of training. Even the cross-legged position was denied to those who were accustomed to use it. After this time, however, the coaches permitted the firers to drift into their more natural positions. The principal thing that the coaches noticed was the tendency of a large percentage of shooters to find more steadiness in a position in which the feet are closer together than in the prescribed position. Often the feet were no more than an inch or two apart. On the other hand a number of men got their best results from the prescribed position.

THE STANDING POSITION

The most pronounced variance from the methods of training regulations occurred in the standing position instruction. The value of the different system used seems to have been proved by the fact that among the teams that used it were the two most successful, those of the Infantry and the Navy.

In assuming this position the firer first selects a level place on which to stand. With the side of his body toward the target, he stands with his heels on a line with it and about a foot apart. This distance need in no way be taken as exact, as it will vary considerably with different men. If training is begun with feet spread about a foot, the shooter will soon habitually take the standing position which is most natural to him. The firer then allows his body to sag comfortably at the waist and to slouch forward a little at the shoulders. He should then have a feeling of complete relaxation and solidity of position. This solidity is not the solidity of muscular bracing so much as it is the solidity of settled compactness of the trunk.

The firer then takes the rifle in both hands and carries it parallel to the ground about as high as his head. This movement pulls his clothing loose at the belt and shoulders so that it will cause no binding, however slight, during the firing. He places the butt of his piece upon his shoulder, not in the hollow, but well out upon the junction of the arm and shoulder. He raises his right elbow a little above the horizontal and grasps the small of the stock with his right thumb over it and his three lower fingers gripping and pulling back slightly on the rifle.

The left hand holds the rifle under the rear sight. The left forearm is almost vertical and the upper arm is inclined outward so that it is free of the body. In this position the firer's elbow is directly under the piece and his forearm is in the same vertical plane as the rifle. The function of the left arm in offhand firing is to hold up and steady the piece only. When this much of the position has been assumed, the firer pulls the rifle well across his body. He then permits his head to drop forward and rest solidly upon the stock, with the cheekbone fitting over the thumb as described above.

This position, like the others, varies considerably with the individual, although the method of taking it is about the same for all men. Hence, coaches must study the position of each firer and with his cooperation work to arrive at the best position. The underlying purpose of this offhand position is to hold the rifle in the most relaxed manner possible without the sacrifice of steadiness. Men trained

to this position soon learn, because of its ease, to forget entirely the position itself and to concentrate all of their attention upon the sight picture and trigger squeeze where it belongs. This is the utmost that a position can be expected to accomplish.

TRIGGER SQUEEZE

When the coaches were satisfied with the progress of the squad members in assuming the firing positions, they proceeded to the trigger squeeze. There are a number of reasons for teaching bolt manipulation before trigger squeeze. But there is still another and better reason, based on psychology alone, for beginning trigger squeeze work as soon as possible. From the first time a recruit is permitted to aim his rifle, the act seems incomplete unless he pulls the trigger. This applies just as much to members of the Infantry Team squad. Hence, for this reason, and also because many of the squad members needed little or no practice in the trigger squeeze, trigger squeeze instruction was begun as soon as possible.

The trigger squeeze which is prescribed in training regulations is not quite suitable for the finest rifle shooting. A squeeze in which the crude elements of the lock, such as slight creep, are not noticeable, is better for the most expert work. Therefore, the instruction received by the squad members was to clasp the piece at the small of the stock with the three lower fingers and the thumb, keeping the hand well back, with the trigger finger entirely free from the stock. This position of the hand causes the trigger to be closer to the tip of the forefinger than in the prescribed method. The trigger touches near the lower end of the first joint rather than in the middle of the second. The next instructions were to squeeze straight to the rear, keeping the trigger finger clear of the wood. With this form of trigger squeeze the slack can be taken up quickly, the firer has perfect control over his finger, and when the amount of pressure required to fire the piece is finally exerted on the trigger, the trigger release is instantaneous. This manner of squeezing the trigger is faster than the prescribed method, and the increased speed of firing reduces, in turn, the strain of holding.

BOLT MANIPULATION

Here again the coaches made no attempt to divorce the training from what had gone before. But when the initial rapid-fire bolt manipulation was begun, the shooters received instructions to keep their attention concentrated upon the bolt. "Work the bolt as hard and as fast as you can," the coaches insisted. This stressing of speed in bolt manipulation continued for two weeks, by the end of which time most squad members had become hardened and coordinated. Naturally, during this period of speeding up there was some sacrifice of accuracy. But the errors which had crept in were not so firmly implanted that they could not be weeded out easily after the high manipulation speed had become automatic.

(The next article of this series will appear next month)

Chemical Warfare Tactics

Snow problem for officers of all arms[1]

LIEUT. COL. CHARLES E. T. LULL, C. W. S.[2]

MODERN warfare demands an ever-increasing breadth of tactical knowledge on the part of the individual officer. The several combat arms enter into intimate cooperation in the teamwork of battle. The types of weapons within units are becoming more and more diversified. The far-reaching and searching effects of the enemy's means of combat now jeopardize not only front line elements and their supporting auxiliaries, but also reserves and installations of command, supply, and evacuation.

It is no longer sufficient for any officer, therefore, to know the tactics of his own arm. He must have, in addition, sufficient knowledge of the powers, limitations, and tactics of other arms to cooperate with them and profit by their support; and, if necessary, to control their tactical employment. To fulfill his responsibility to the troops under his leadership, he must also know the effects of combat means at the disposal of the enemy so as to recognize their menace and be prepared to minimize their destructive effect.

It is with full appreciation of these requirements that the War Department has caused the special service school of each branch to include in its curriculum instruction in the tactics of other branches. The general service school studies each of the arms and services as a foundation for courses in their combined tactical employment.

The result of this wise policy has been quite satisfactory, and officers are, as a rule, equipped to go beyond the narrow limitations of their own technical specialties and adapt themselves to the broader phases of their profession. School instruction by itself is insufficient, however, to fit an officer for his responsibilities in the field. To gain full appreciation of military materiel and familiarity with the methods of its use, he must come into actual contact with it and take advantage of every opportunity to observe the work of troops charged with its operation.

To the enterprising officer, anxious to improve his professional efficiency, there is no lack of opportunity to make such contacts and observations. It simply requires, as a rule, a little effort on his part. Among these opportunities are presence of combined arms in a number of our larger posts, especially in foreign service garrisons; the summer exercises, both Regular Army and National Guard, in corps areas; and such exhibitions as the one held each year at the Aberdeen Proving Ground and in the various military carnivals throughout the country. There is, however, a marked limitation to knowledge and experience which can be gained either in schools or by the observation of weapons and their

[1] By special arrangement between the author and the editors, this article appears in publications other than the JOURNAL.

[2] Published with permission of the Chief of Chemical Warfare Service, U. S. Army, who is not responsible for any opinion expressed or conclusions reached herein.

employment. While such training and experience are invaluable in equipping an officer for his rôle in the teamwork of tactical operations, they fail to give him an adequate appreciation of the real effects of the enemy's combat means.

This limitation of peace-time training has always been recognized, and ingenuity has been taxed to the utmost to overcome it, but without success. The harsh school of battle remains today, as it has been in the past, the only school in which true impressions of the battlefield can be gained. As a result, the officer, until seasoned by battle, will always be handicapped by the lack of this essential element of preparation to meet his responsibilities in the field.

Experience has shown that habit and instinct play, in battle, a far more important part than do logic and mental calculation; that officers and men will generally do what they are in the habit of doing; but that they cannot be expected to do things to which they are not accustomed. It is, therefore, in the attainment of sound battle habits and instincts that we must seek, in time of peace, to compensate for the lack of experience which only battle itself can supply.

In military drill, developed as a result of thousands of years of battle experience, we have a system for the formation of habits of action which will cause the soldier to act effectively and even subconsciously when his mind is dulled by the nerve-racking effect of modern battle. In the training of the officer, repeated insistence on the lessons of former wars and on their application to varied situations develops certain habits of mind which serve to guide him under the unfamiliar and bewildering conditions of campaign. These mental habits are such, for example, as cause the trained officer to sense instinctively the vital necessity of outposts when encamped in the presence of the enemy, and, in battle, the need of flank protection and contact with units on right and left. The development of such mental habits in connection with chemical warfare is the subject of this study.

The agents of chemical warfare, unlike other means of combat, are controlled in their behavior by the normal processes of nature. Dispersed in their persistent form, they lie as liquid or solid substances on the ground, foliage, or other surfaces, and evaporate like snow or water under the influence of sunlight, heat, and wind. When dispersed into the air as gases, drops of liquid, or solid particles, they drift with the wind and dissipate, like smoke or fog, under the laws of motion and gravitation. By observing snow, surface moisture, smoke, or fog, we can form accurate impressions of the corresponding behavior of chemical warfare agents. By contact, in our daily life, with the ordinary phenomena of nature, we gain familiarity with the operation of their natural processes. As a result we know, instinctively, how to protect ourselves from their harmful effects, and how to carry on our activities in spite of the obstacles that they create. Similarly, by intelligent and systematic observation of these same natural phenomena, we can interpret the information they convey into tactical knowledge of chemical warfare. As a result we will be prepared to guard instinctively against the harmful effects of the chemical

means of the enemy, and to carry our missions into execution in spite of his casualty-producing agents.

In our present study we shall limit our discussion to conditions that arise from the enemy's employment of the one chemical agent commonly known as "mustard," or "yperite." For the purpose of simplicity, and to establish a logical basis for further study along this line, we shall also confine ourselves to the "contact" effect of this agent, as distinguished from what we may call its "gas" effect. Mustard, it will be remembered, was the most effective of all chemical agents used in the World War. At the time of the Armistice, it was freely used by both sides. It is still the outstanding means of chemical warfare, and the field of its use has been considerably broadened by recent developments in technique. Its tactical use, the method of its dispersion, and its general behavior are characteristic of all the so-called "persistent" agents. It is from the similarity of its behavior to that of snow and surface moisture that mustard lends itself particularly well to study along the lines we are now considering.

Mustard is an oily liquid of about the consistency of heavy lubricating oil. Dispersed by artillery shell, aircraft sprinkling, bombs, armored cars, tanks, or other means, it falls and lies upon the ground, foliage, and other surfaces. It evaporates under the influence of sunshine, heat, and wind. Contact with liquid mustard or with ground, porous wood, or other porous substance infected by mustard, causes severe burns. The evaporation of mustard sets up clouds of poisonous gas. Depending upon the amount of chemical used, the nature of the ground, and the weather, an area infected remains dangerous for a normal period of from one to two weeks. Where evaporation is rapid, this time may be considerably shortened. Where evaporation is slow, it may be prolonged for a month or more.

Conditions that cause snow to disappear quickly and surface moisture to dry up, also favor the rapid disinfection of mustardized ground. Similarly, conditions that cause snow to remain on the ground and surface moisture to persist, cause a corresponding persistence of mustard infection. By observing snow and surface moisture, therefore, and by noting the places where and the conditions under which they tend to disappear, we can learn to estimate the behavior of persistent chemical agents.

With this elementary conception of the analogy of chemical warfare to natural phenomena, our problem becomes quite simple. It consists, logically, in first observing methodically the behavior of snow and surface moisture, and then in applying the lessons gained from these observations to the solution of simple tactical problems on the ground on which the observations were made. This system was used with exceedingly satisfactory results by officers of all arms in the III Corps Area in 1927. Briefly stated, the procedure was as follows:

Where opportunity occurred to observe the effects of a snow storm which resulted in covering the ground, the places were noted:

First, where the snow disappeared within twenty-four hours.

Second, where it lingered on the ground for several days, often a week or more, after the storm.

Third, where the snow persisted for long periods after it had disappeared from the rest of the country.

It is evident that the nature of these observations was based on climatic conditions in the III Corps Area. In colder climates, where the snow lies on the ground for long periods, the method would have to be modified to meet prevailing conditions.

Where no opportunity to observe snow was afforded, analogous conditions were observed after rainstorms, with due allowance, of course, for the effects of drainage. It was the moisture of the ground, rather than running or standing water, which was significant. This was the situation at Fort Eustis, where no snow fell while these problems were being solved. Comparison of results showed, however, that the conclusions based on the observation of moisture coincided with those of officers in Maryland and Pennsylvania, whose deductions had been based on the observation of snow.

In both instances the prevailing weather was observed and its effect on the general rate of disappearance of snow or moisture was noted. The officers gained a clear conception of the causes of the phenomena that they observed. The impressions thus gained gave them an understanding of the whole problem of chemical persistency in the field, so that the answers to the questions of its tactical application became self-evident.

These observations were followed by a series of three simple tactical problems. In order to coordinate results and, in particular, to compare the conclusions of officers of the different arms, the general directive prescribed certain guiding features and requirements. It left to local commanding officers the choice of terrain and the detailed preparation of the problems themselves. The situations involved were so simple, however, that any officer might have visualized his own and obtained results of equal value.

The directive prescribed that problems be based on the operations of a battalion of infantry, a battery of artillery, or an appropriate corresponding unit of any other arm, on local terrain assumed to have been infected by mustard two weeks before, and under situations with requirements as follows:

Situation No. 1, involving a temporary halt in the course of a route march. Requirement: Selection of halting place and precautions to be taken during the halt.

Situation No. 2, involving an approach march, or movement into position. Requirement: Selection of lines and formations of advance, with precautionary orders.

Situation No. 3, involving a bivouac. Requirement: Selection of ground, and precautionary instructions.

To avoid confusion by the introduction of too many factors into these initial problems, the "gas" effect of the mustard was in each instance assumed to be negligible owing to the time elapsed since infection. The problems reduced themselves, therefore, to the simple question of carrying out the desired operations with a minimum of "contact" casualties.

This assumption is, of course, dangerous and would be entirely unwarranted in the field. An area that

has been infected by mustard should always be considered as a gas-trap until proven otherwise. Where it or its vicinity must be crossed, gas masks should be worn and every precaution should be taken to avoid their premature removal. Especially should such an area be avoided as a bivouac. Gas poisoning is accumulative, and a light concentration breathed over an extended period is as harmful as a much heavier concentration breathed for a short time only. When tactical necessity is imperative, however, areas of this kind may have to be crossed, or even occupied, though it be at the cost of casualties. When such a necessity arises, the knowledge and instincts gained by these methods may spell the difference between success or failure of an officer's mission.

The solution of simple practical problems like those outlined above requires neither equipment nor money. Technical knowledge of chemistry is unnecessary to a clear understanding of chemical warfare fundamentals. Valuable results can be secured from a minimum expenditure of time and effort. Systematic observation and common sense applied to this phase of military training will result in sound tactical knowledge of the conditions on which chemical warfare is based.

Safety!

ONE-THIRD of the entire Regular Army of the United States was stationed at Fort Pitt, Pennsylvania, after the disbanding of the Continental Army in 1784. Alexander Hamilton's single battery of artillery was all that remained, and it consisted of eighty men divided as storekeepers between West Point and Fort Pitt.—*Col. T. M. Anderson, Infantry, in an address to the Reserve officers of the 99th Division at Greensburg, Pa.*

Rolling Kitchens

CAPT. LOREN A. WETHERBY, Infantry[1]

THE supply of food to the soldier is of paramount importance in campaign. An interesting field for study is the effect of the mechanical and material development of the day on this almost always difficult task.

The problem of the delivery of food to units down to and including the regiment is in no way materially different from what it has been in the past. It is still dependent upon the kind of transportation available at the time and place. The volume and quality of food necessary per man per day have not changed. But the supply of food from a regiment or a battalion to the company, and from there to the soldier in the front lines, has been and still is a difficult problem. Nevertheless, modern invention has provided a means for materially bettering this ultimate supply to the soldier.

Much study and many experiments indicate the following features to be desirable in the food supply mechanism:

1. The kitchen should be capable of being operated for the preparation of food while in motion on the march.
2. The size of the kitchen should be sufficient to supply cooked meals for two hundred and fifty men.
3. The weight of the cooking medium and its equipment should be reduced to the minimum consistent with efficiency and ruggedness.
4. The kitchen should be capable of being operated when removed from the vehicle, and all or part of the vehicular portion of being used for the transportation of new food supplies.
5. The kitchen should be inconspicuous.
6. The kitchen should be easily transportable and capable of accompanying troops regardless of the means of transportation provided for the troops.

Let us see how these problems have been met in the past and how the means therefor have been developed.

The field range was one of the efforts to solve the feeding problem. It could not be used for the preparation of food while on the march. It took considerable time for setting up. The smoke from the wood fuel made it somewhat conspicuous, as did the excavation for its installation. It could, however, be set up in position and the ration and baggage wagon could be used for transporting new food supplies, and it could be carried with the troops regardless of the kind of transportation employed. It was not unduly heavy. Nevetheless it was not a satisfactory solution.

The next development was an animal-drawn, limbered type of rolling kitchen. This type of kitchen could be operated en route, but it was never thoroughly satisfactory. The capacity of the war-time kitchen was not sufficient, and the kitchen was difficult to operate efficiently. It was not rugged enough for marches over rough terrain. The smoke from its fire made it conspicuous. It was awkward to handle in any other way except as an animal-drawn vehicle, and even then the fact that it was limbered made it unwieldly.

[1] Department of Experiment.

Its main advantages were that it could be fired and operated en route and that the cook-stove portion could be unlimbered from the forward cart section and the forward section used as a cart for bringing forward new food supplies.

The next development was the construction and test of four-wheeled vehicles which had built-in stoves, ovens, and compartments for the transportation of food supplies. The most promising of these vehicles was the Taylor 31. It had space for the cooks to operate it while it was moving, its capacity was sufficient, and it was not unduly heavy. It had space for and could carry the food for another meal in addition to the one being cooked. If oil burners were used it gave off little smoke to betray its presence. But the stove portion could not be detached from the vehicular portion so that the vehicle could be used to carry up new rations while the stove remained in position. The kitchen was also difficult to conceal. It was difficult to handle except as an animal-drawn vehicle, although it was possible to build it for use as an automobile trailer. These were considered to be major objections. The same objections were raised academically to the construction of a motor truck rolling kitchen.

This brings us to the consideration of the advantages and disadvantages of the limbered type of rolling kitchen as contrasted to the four-wheeled vehicular type.

The Field Artillery took the following position in this matter:

1. Placing the entire kitchen on one chassis is wrong for front line organizations. It is evident that such large, unwieldy groups cannot be taken near the front lines, that they cannot be easily camouflaged, and that no provision is made for moving the cooked contents to the immediate vicinity of the front line.

2. The limbered type of kitchen is far superior in this respect. In this type the rear group is the stove and the front group, or limber, contains thermos cans in which uncooked rations are carried when the cans are not otherwise in use, and in which the cooked rations are transported to the front line at night.

This view came out again after the Taylor 31 had been tested as a trailer behind motor trucks. The Field Artillery found mechanical defects in this test and stated that the kitchen was too heavy when fully loaded.

The Infantry, however, came to different conclusions which are:

1. After an extensive test of rolling kitchens the Taylor 31 was found to be decidedly superior to other types tested.

2. In 1922, the Taylor rolling kitchen was tested on a road march from Fort Benning to Camp McClellan and return, a total of two hundred and ninety miles. The report of test shows that the weight is not excessive for four animals.

3. Infantry rolling kitchens will normally be animal-drawn. As trucks will be unable to move cross-country into position, tractors should be provided when infantry transportation is motorized. With long moves of infantry by trucks, when necessary to take rolling kitchens along, the Taylor 31 can be placed on a three-ton truck and be kept with the column. The mechanical defects noted by the Field Artillery can probably be overcome.

4. Infantry practice is to place kitchens as near to the front as possible and to have carrying parties supply men who are separated from the kitchens. Artillery kitchens are further to the rear and can more readily supply men by organization

transportation. While the limbered vehicle may be more desirable for field artillery, the chassis of the Taylor 31 is considered more satisfactory for infantry.

In view of the fact that the artillery is seldom in as close contact with the enemy as the infantry, it would seem that a solution of this problem by infantry would be equally suitable to artillery.

The War Department, however, did not approve of the adoption of the Taylor 31 rolling kitchen. It gave as the military requirements for a rolling kitchen:

1. It must be capable of cooking for two hundred and fifty men while at rest or moving with a marching column.
2. It must be a limbered vehicle with the cooking part on the main chassis and with the limber so arranged as to carry uncooked food or hot cooked food.
3. It must weigh complete not more than three thousand four hundred pounds.
4. There must be no permanent top.
5. It must be arranged for traction by four mules and for ready conversion into a trailer.
6. Fuel oil is the preferable fuel if a burner can be developed to operate as satisfactorily as other fuel. (This requirement is not stated as mandatory.)

Information obtained from tests with the mechanized force and elsewhere indicates that the use of trailers is not advisable. Even rolling kitchens should be self-propelled. The fumes of motor towing vehicles are obnoxious to men who must ride on the trailer. Trailers sway from side to side so much that they must be driven near the center of the road to prevent them from going into the ditch; this hinders the passing of other vehicles. When a sudden stop is necessary, perfect coordination in applying the brakes is required on both the towing vehicle and the trailer or there will be an accident caused by the trailer jamming the towing vehicle. Observation by the man at the brakes of the trailer is much impeded by the bulk of the towing vehicle, and thus coordination is almost impossible. This is particularly noticeable with a limbered vehicle like a rolling kitchen.

The Infantry has on several occasions stressed the need for the development of motorized kitchens. This is particularly necessary for motorized units.

Under a decision that any rolling kitchen adopted must be standard for all branches, and as the artillery considered a limbered type kitchen essential, development went along those lines. This resulted in the construction during 1927 and 1928 of the present experimental rolling kitchen, which is designed for transportation by animals or for use as a trailer. This kitchen is now being tested.

While the tests of the 1928 kitchen are not yet complete, we have considerable information about it and how it works. It is the most satisfactory limbered type kitchen yet devised as far as cooking and baking are concerned. It can be used en route with fair success when animal-drawn. When used as a trailer it has to be stopped each time that the cooks have anything to do, such as stoking, stirring food, or adjusting the drafts. Its capacity is ample. It is quite heavy and in sand or deep mud will quickly tire four animals; but, having roller bearings in the wheels, it is easily moved over hard roads. Being limbered, the forward

part may be used as a ration cart, although uncoupling the kitchen is awkward and difficult when it is hot. It is built for the use of wood or coal as fuel, and this renders concealment difficult on account of the smoke. The size and shape of the kitchen make it easily discernible, as contrasted with artillery. It is difficult to transport this rolling kitchen in any other manner than on its own wheels. It is too large to go into a class B Liberty truck. When used as a trailer it is open to the objections to trailers that we have already noted.

For the above reasons it therefore seems that we have not yet fully solved our problem.

We are living in a period of rapid change in methods of transportation. All indications point to the greatly increased use of motor transportation in any war of the future. What, then, should be the line of development of the equipment for preparing and delivering cooked food to the soldier? Types and models of transportation change so frequently that no one vehicle can be considered as the best or as standard for more than a short time. It seems to the writer that the solution would be found if a means of preparing food could be developed which could be transported in any type of transportation from ox cart to dirigible. Can this be done? The writer believes that it can.

At present there are widely sold successful gasoline camp stoves. A boys' school has made and used a gasoline-fueled range for cooking for two hundred boys on a cross-country march. This stove and its kitchen equipment were carried in a converted small automobile. The stove was not permanently fastened to the truck. The burners operated on the principle of a blow torch.

It seems, therefore, that a gasoline-fueled field range can be developed and carried in any kind of transportation available to infantry—wagons, motor trucks, railroads, or ships. It could be built so that cooking could be done while the stove was being transported. Its over-all dimensions should not be over five by three by three feet, so that there would be space to work around it in common vehicle bodies. Such a field range could have a capacity sufficient to accommodate two hundred and fifty men at any one meal. The stove portion could be built to weigh not more than five hundred pounds, with detachable ovens, boilers, containers, and kitchen vessels, weighing not to exceed three hundred pounds additional. It should be provided with casters and with detachable long handles for lifting. The burners could be similar to those of a gas stove, operating under pressure feed. Guard rails on the sides of the stove would prevent the hot sides from coming into contact with the sides of the vehicle and making a fire hazard. The frame could be made of structural steel beams properly arranged to support the weight of cooking utensils and similar articles. Sheet-iron panels and doors could fill in the spaces and prevent drafts from striking the flames and diverting the heat. Such a stove could be removed while in use and placed on the ground as close to the front line as any vehicle could approach. The vehicle could then be used for transporting a re-supply of rations. Thermos cans could be carried with the stove and used for conveying food forward. The gasoline fuel would be readily obtainable from any truck

or motor supply point; the amount used would not be excessive, for five gallons would probably be more than enough for one day's supply, even in the coldest weather. Gasoline is no more difficult to obtain than wood or coal. There would be no smoke from such a stove and a long stack would not be necessary. The stove could be easily concealed under trees or behind embankments. It would take no longer to set up the kitchen than to remove it from the vehicle. Utilizing the handles provided with the range, four men would be able to move it with ease. It could be carried in any sort of vehicle used by troops. If artillery wished to use two-wheeled carts for this purpose it could do so. Two such carts could be limbered together, one to carry the stove and the other to carry uncooked rations. But infantry would prefer a wagon or a motor truck.

Development along these lines would leave the Infantry ready to go, regardless of the kind of transportation available, provided only that it had cargo-carrying capacity for the load.

A Correction

THE legend for the frontispiece of the December number, a picture of the First Year Class at Leavenworth, contained an error. It gave Captain Hones as vice president of the class and Colonel Strong as president. This should have been just the other way around. We apologize.

Our Uniform

MAJ. F. P. AVERY, U. S. Army, Retired

Written by Major (then Lieutenant) Avery, Infantry, for presentation before an officers' meeting at Fort Snelling in 1889, this paper is an interesting glimpse into the past and a remarkably accurate forecast of the present—or what was then the future.—EDITOR.

I DO not expect to cause the assembly of a congress of nations as the result of this exposition of my ideas on a subject in which I am so earnestly interested. I do not even hope to move our own all-wise and powerful government in this matter. But I do intend to add my mite, and hope it may do something towards furthering the discussion, already started in this direction and in which so many are interested, trusting that eventually these discussions will lead to an earnest consideration of the subject by military men in general, and military authorities in particular; and that they may possibly result in a much-needed change in our uniform. This change seems to me to be of the utmost importance, even an absolute necessity, in times of military activity. To delay, even now, in peace time, is dangerous in the extreme.

The United States Army represents the power of our government. We are a part of its executive power, the only means it has at hand, on land, of enforcing its mandates. A representation of this power is in many times, and in many places, all that is necessary. In order to represent this power and authority with any moral force we must have a distinctive, conspicuous uniform. We might as well have no uniform at all as to have one that can be worn by anybody who cares to put it on. We must not only have a uniform that can be recognized by a military man, but one that can be identified, in these times of many uniforms, by any one, no matter how uninitiated he may be; one that the uneducated classes may know at a glance, without the shadow of a doubt as to what it is, even if they have never seen one before.

The tendencies of affairs today would seem to make this a necessity. In these days of powerful labor combinations, necessitating the use of both state and United States troops, the necessity seems evident. The United States troops are generally not called on except as a measure of last resort. They then appear in precisely the same uniform that was worn by troops who have been unable to handle the situation. The only means then left for the United States troops to use in reestablishing respect is the influence or force of United States arms. Armed action probably is rarely necessary if the troops be recognized at once as United States troops. What possible moral force can we be expected to have if we are not recognized? If men who are somewhat versed in such matters mistake the best drilled, best dressed, and best equipped United States soldiers for state troops, what can be expected of the ordinary working man or the average citizen who gives military matters no especial thought?

It is now possible for a boy to wear

the full uniform of a colonel of the United States Army. I say, when it is possible for this condition of affairs to exist, and it does exist today, and boys do wear the uniforms and insignia of rank that men have devoted a lifetime to obtain, then it seems to be time for the military student to suggest some remedy.

A Regular soldier should be so conspicuously dressed that not only the military man but the nonmilitary man can tell at a glance what he is, no matter if he has never seen one before. Descriptions of our uniforms appearing in the newspapers should be enough to enable a nonmilitary man to recognize Regulars at a glance, and the color of the uniform I am going to suggest will enable him to do so. I write concerning our business uniform. In the dress uniform I am not so much interested. Our fighting uniform is what interests me.

I do not intend in this short essay to enter much into the details of a new uniform. This brief effort of mine is simply a plea for a new color. A few reasons are advanced why one seems necessary to me. I recognize the uselessness of discussing the details, as such things are decided by those higher in authority with a studied regard for the interests of those they affect.

I have said that our uniform should be conspicuous and easily recognized. This necessitates the selection of a new color. Fortunately for us, the best and most promising color for a practical working and fighting uniform has not been chosen by any organization, and probably will not be, because it is not striking enough—not pretty enough for play soldiers.

The color I refer to is that of dead-grass—the hunters' color—now almost solely used by the sportsman. And why? Because it is not so easily seen by the wary game they pursue. The experience of years of the most intelligent and successful hunters in the world has taught them that the dead-grass color is the best that can be worn when they wish to approach the quick-eyed game they hunt. Why should we not take advantage of this experience? Why not profit by it when we hunt or are hunted under conditions similar to, but much more critical, than those of the sportsman. Instead, we copy some foreign uniform with its inconveniences and ridiculous notions. We have proven ourselves ingenious and intelligent in other things; why not, therefore, in this matter be bold and originate a uniform that will not be a copy of one worn three hundred years ago?

Throw away our nonsensical forage cap and wear a hat found on every one who lives much in the open air. Do away with our tight fitting blouses, and put on a coat with a generous collar that will afford protection in time of need. Adopt a coat with pockets in which to carry the trifles so indispensable to a soldier's comfort on campaign duty. And, most important of all, use a color that will not make an individual soldier a conspicuous target at one thousand yards.

My statements may appear somewhat contradictory at first, but I will endeavor to make myself clear.

I commenced this article by emphasizing the importance of our uniform being distinguishable from all others, and now I choose a color that is chiefly recommended because the least conspicuous of all. My reasons are that

for street work, when we would be associated with other organizations, at a short distance, with well-defined surroundings, our contrasting color would be very conspicuous. But in the neutral colored field, against an enemy, our dead-grass color would give us a most decided advantage in maneuvering on the field of action for the very reason that we would make much less conspicuous objects of ourselves than any body of uniformed troops of which I have any knowledge.

At the short distance of six hundred yards I have seen our soldiers in regular uniforms stand out in bold relief against a dirt background, when others wearing our canvas fatigue clothes were practically invisible to the naked eye. Our canvas fatigue clothes are not the color I recommend, but somewhat similar, and show what an advantage a neutral color would be. The moral effect on a body of troops seeing while practically unseen would be a great advantage. Nothing will so quickly demoralize troops as to be unable to return an effective fire while receiving fire from an unseen enemy.

Even if we do succeed in getting a new color for our uniform, let us hope that the same influence that obtains it will also take measures to protect it by passing laws making it a penal offense for any one not in the service of the United States to wear it.

From Woodhull's Military Hygiene I have made the following interesting notes that, in part, support my ideas on a new color for a uniform and other closely allied matters.

As war tears away the non-essentials but does not supply the deficiencies, the clothing he is compelled to wear should be suited to a soldier's arduous work. The essential object of all clothing is the protection of the person from the extremes of temperature by conserving bodily heat in cold weather, and preventing suffering from either solar heat or that generated by exercise.

Soldiers should be dressed as nearly alike as possible, and uniforms have obvious military advantages. Each arm should be distinguished by its appropriate dress. They should be inconspicuous to the enemy but serve both for identification and as a sign of comradeship within the army. There is a constant temptation with new troops to wear some conspicuous mark of regimental significance, whose ultimate effect is to draw fire. Regimental facings are sometimes favored in the interests of regimental esprit. Good results would follow with good troops. In the Crimea the British suffered severely in attempting to keep up their regimental clothing.

Color is a physiological and a military factor in clothing. Military garments should be neutral in tint. Cadet gray is the best of colors, and next to it a butternut dye, somewhat lighter than the fatigue clothing. Colors draw fire in action in proportion to their conspicuousness, red being the most deadly and white next. Scarlet tells with great effect upon the wearer. Zouave regiments certainly have left some dead upon the field that would have been saved in plainer dress. The old-fashioned white cross belts have had many victims. Dust-gray is the least readily observed of all colors, and the ordinary soil of the field is less marked upon it.

Protection against the sun's rays depends entirely upon color, irrespective

of texture. Color does not influence bodily heat, nor the external temperature except as derived directly from the sun. White absorbs the least heat, and is therefore the coolest, black the most, and is the warmest. Blue is next to black. Gray, because of its coolness in the sun and its inconspicuousness against nearly every background, is the best military color. The order in which colors draw fire is red, white, black, or dark blue, light blue, butternut, and dust gray.

Reports of the medical officer at Ringgold Barracks, and of the Medical Director, Department of Texas, in 1886, preferred white duck or linen uniform, with mixed cotton and wool underclothing, or a dust color uniform one-third wool and two-thirds cotton. It may be assumed that white all-wool is unreasonably oppressive, an entire cotton dress would be dangerous for men liable to the sudden exertion of military life.

The ideal military hat should protect against heat, cold, rain, and the glare of the sun. It should be attractive on parade, convenient under arms, and useful in bivouac. Such a headgear has not yet been adopted. The great variety of hats authorized illustrates the difficulty.

The felt helmet, heavy, hot, inflexible, and oppressive, is an imitation of foreign dress, having no value except for show, and that at a great waste of vital force.

The white helmet is a comfortable protection against the sun, but it is unfit for cold seasons and it is too conspicuous and inflexible for the field.

The forage cap protects against neither extreme of climate. With an open air temperature of 90.2°F., the temperature within the crown of a forage cap worn in the sun was 100.5°, in a black felt hat, 98.3°; in an ordinary straw hat, 95°; and in a cadet helmet, 92.5°. A military cap should always be high enough to clear the crown of the head, and in the warm climates ventilation should be provided.

The campaign hat as issued with high crown and broad rim is fairly but not perfectly suited to the field, and not well adapted to garrison wear.

An ordinary sportsman's hat, with high crown, double peak, and folding flaps, as evolved by hunters, would fulfill the requirements of open air life. Of neutral color, to be decorated to military requirements, for hot weather it should be made of light canvas and lined for cold seasons.

The present undress coat is a loose, fairly fitting flannel sack, with pockets in the breast and side skirts. When sufficiently loose it is not conspicuously bad, but it is unsightly when the belt is worn. The hunting shirt, to which in some form all woodsmen and frontiersmen come, is the natural and typical military dress. By slow degrees the working dress of the army is approaching it.

The ideal military blouse should follow the figure loosely, be large in the shoulders and arms for unconstrained action, small at the waist, full in the body for abundant underclothing and free motion. It should have a belt between the body and the skirt upon which the waist belt should fit and should be held together in front by an inner belt with graduated fastenings. It should have stout pockets in the body and skirt. The skirt should be just short enough to clear the ground

when kneeling to fire. It should be made of closely milled light woolen cloth. To this I would add a cartridge vest such as is used by hunters for carrying ammunition. Such a vest can be made to carry from fifty to seventy-five rounds of our present ammunition, and with less inconvience to the soldier than any way I know.

The general and only objection to the above described uniform is that it is unmilitary and slouchy. I do not believe that the true use of a uniform is to hold a man in shape and position. He should hold himself in shape. Thorough drill and setting-up exercises will make him do it.

One military man to whom I described the above uniform remarked that the men would look like the devil dressed in such a rig. This comment I thought rather favorable, for, if we can get our men to look like that gentleman and fight like that gentleman too, I do not see what more we can ask.

The 316th Infantry—An Up and Coming Regiment

THE 316th Infantry, Col. H. Harrison Smith commanding, believes in preparing its officers thoroughly for their summer active duty, which is in connection with a Citizens' Military Training Camp at Fort Eustis, Virginia. In order that the officers may make themselves competent instructors the regiment has just bought seventy-two copies of the Infantry Association's new book, *Basic Field Manual, Volume II, Infantry Drill Regulations.* The authoritativeness, completeness, and convenience of this book should make it a real help to the officers of the 316th Infantry.

Moral (for all other Infantry units)—Go thou and do likewise.

Retrospect[1]

A condensed review for the busy reader

MAJ. FRANK B. JORDAN, Field Artillery

FIVE FORKS

PART ONE: OPERATIONS BEFORE PETERSBURG AND RICHMOND

AFTER THE MINE

AFTER the disaster of July 30, both sides settled down to watchful waiting. Matters were not going well in the Valley, so Sheridan was ordered there to take general charge of operations. Wilson's and Torbert's cavalry divisions were also ordered to the Valley with a view of giving the Union forces superiority in that arm. Shortly after Sheridan's departure Grant decided to threaten Richmond in an attempt to prevent reinforcements from being sent to Early in the Valley. Lee had started Hampton's cavalry division to reinforce R. H. Anderson at Culpeper, but recalled it as soon as Grant began his demonstration.

DEEP BOTTOM

Hancock, with the II Corps, Gregg's cavalry division, and a detachment from the Army of the James under Birney, crossed the James near Deep Bottom. On the morning of August 14 he attacked the Confederate position north of the river. Birney carried part of the hostile line, but the attack of the II Corps was unsuccessful, so Hancock desisted for the time being. The following day he maneuvered to the right to develop the hostile position, and on the 16th renewed the attack, breaking through the enemy's line between the Darbytown and Charles City roads. The success was only momentary, as the Confederates restored their line with a prompt counterattack. The next three days were spent in skirmishing, without serious operations on either side, and on August 20 Hancock was withdrawn to the south side of the James.

WELDON RAILROAD

While Hancock was engaged on the northern bank of the James, Grant, seeking to take advantage of any weakening of the lines before Petersburg, extended his left to the Weldon Railroad. The V Corps, with two brigades of cavalry, struck the railroad near Globe Tavern on August 18 and advanced north along it. At about noon Warren encountered Heth's division, and a sharp struggle for the possession of the railroad took place, without decisive result. During the night of the 18th, three divisions of the IX Corps were started to Warren's assistance.

Warren now was in position about three miles from the Union left, and on the 19th was vigorously attacked by A. P. Hill before the IX Corps had come up. The V Corps resisted stoutly, and finally beat off the attackers with the assistance of the three divisions of the IX Corps that had just arrived on

[1] The reader is referred to the introduction to the first article of the series, page 238, INFANTRY JOURNAL for September, 1928.

the field. August 20 passed quietly, but on the 21st the Confederates repeated their desperate efforts to regain the railroad, but were finally repulsed with loss, and Warren's position was made a part of the main Union line.

REAMS' STATION

On August 25, Hancock, who was at Reams' Station with the II Corps and Gregg's cavalry division destroying the Weldon railroad, was vigorously attacked by A. P. Hill. The fighting was quite sharp, and a determined assault late in the afternoon carried part of Hancock's line. The Confederates captured many prisoners and several guns, but Hancock finally extricated his corps under cover of darkness. A division of the IX Corps, ordered to his support, did not arrive in time to take part in the action. That night both sides withdrew to their main line of works.

During the next month there were no operations of importance. On September 16 Hampton made a bold dash in rear of the Union forces and captured some prisoners and two thousand five hundred cattle. Toward the end of September Grant decided that his own extension to the west had probably compelled Lee to weaken his lines north of the James, so he made another effort in that direction.

CHAFFIN'S FARM

On the night of September 28 the X and XVIII Corps were crossed over to the northern side of the James, and on the morning of the 29th carried the Confederate lines below Chaffin's Farm, at Fort Harrison, and on the New Market Road. Field's division was brought over in time to check further advance, and during the night Hoke also moved to the north side. The following day a determined attempt was made by the Confederates to retake the captured lines, but all assaults were repulsed, and the Union line was firmly established on the northern bank of the James.

POPLAR SPRING CHURCH

While Lee's attention was attracted to the northern bank, Meade made another effort on the left of the line. Warren, with two divisions of the V, and Parke, with two divisions of the IX Corps, moved toward Poplar Spring Church. Ayres attacked successfully along the Squirrel Level road, and Griffin was partly successful near Peebles Farm. Parke, moving up on Warren's left, was heavily attacked on the afternoon of September 30, but succeeded in repulsing Heth. Early on October 1 some cavalry action took place, but on the 2nd the Confederates were found to have withdrawn to their main line. Warren and Parke then took up suitable positions to incorporate the new territory into the main Union line.

DARBYTOWN ROAD

The scene now shifted to the northern bank again. Field and Hoke shifted over on the night of October 6-7, and launched a sudden attack against the X Corps along the Darbytown Road. They captured the outer line and nine guns, but the Union troops finally localized the success.

Things remained quiet for about a week, and then on October 13 two divisions of the X Corps launched an at-

tack along the Darbytown road. They carried some outer works, but the Confederate main line was too strong, and finally a withdrawal was ordered to the Union main lines.

FAIR OAKS

Another quiet spell followed. Then, on October 27, in support of a movement on the Union left, the X and XVIII Corps attacked the Confederate works on the Williamsburg road and the York River railroad. They obtained some slight success near Fair Oaks, and on the 28th the whole force was withdrawn again to its original lines. More serious work was being done on the Union left.

BOYDTON PLANK ROAD

In conjunction with the movement north of the James on October 27 parts of the II, V, and IX Corps (eight divisions in all) with Gregg's cavalry division, moved from the Union left toward the South Side Railroad. The Confederates were found strongly intrenched on the Boydton Plank Road down nearly to Armstrong's Mill. Most of the line was too strong to attack, but the II Corps and cavalry succeeded in reaching the Plank road near Burgess' Tavern. There they were vigorously attacked by Heth, but succeeded in holding their position. As the entire move was in the nature of a reconnaissance, Union troops were withdrawn to their main lines on the next day.

Nothing of importance occurred for over a month. Kershaw's division returned from the Valley, as did Gordon's. Warren, with the V Corps reinforced by infantry and cavalry, moved to Sussex Court House on December 7 and destroyed the railroad to Belfield. About the middle of the month Rodes' division arrived at Richmond, and the leading elements of the VI Corps began to arrive at City Point. About a week later Hoke's division was started for North Carolina to meet the threat at Fort Fisher. At the close of the year there were in and around Petersburg and Richmond about one hundred and fifty-two thousand eight hundred Union and sixty-eight thousand eight hundred Confederate troops.

January was uneventful except for the removal of Butler from the command of the Army of the James, and the reorganization of the X and XVIII as the XXIV and XXV Corps, respectively. Early in February operations began again on the Union left, with a view to further extension of the lines.

HATCHER'S RUN

On February 5 the II and V Corps, with Gregg's cavalry division, moved again to the west. The crossing of Hatcher's Run on the Vaughan road was reached and held in spite of demonstrations by Hill and Gordon. Reinforcements from the IX and VI Corps were ordered up to the II Corps, but proved unnecessary.

On the 6th the II Corps continued to hold a line from the main Union left to Hatcher's Run, while the V Corps advanced to the northwest along the run. Warren met Pegram's division, and a brisk fight ensued, in which the latter was killed and his division forced back. Evans' division also entered the fight, but failed to check Warren. By now the latter had

reached the main Confederate line, and suddenly came under heavy artillery fire, and Mahone advanced at the same time and drove part of the V Corps back on the II. The rest of the V was then withrawn to the line of the II Corps for the night. The next day some minor activity took place, but the Union troops were now firmly established and the flank of the main line was extended to Hatcher's Run.

For nearly two months both sides suspended all but minor operations. Lee was having great difficulty with supplies, and on February 8 reported that his men had been in battle almost continuously and without meat for three days. There was none on hand in the Army of Northern Virginia, he stated, and pointed out the necessity for "reorganization of the commissary department if calamity was to be avoided." On February 27 Sheridan left Winchester with two cavalry divisions, en route to join Grant. He reached White House on March 19, having destroyed railroads and bridges all along his route, and rejoined Grant on the 27th, after having rested and refitted at White House.

FORT STEDMAN

Early on March 25, Gordon, with three divisions, assaulted and carried Fort Stedman, on the right of the Union Petersburg line. An attempt was made to exploit the success to right and left, but without result. After several unsuccessful efforts to retake the fort it was finally recaptured with about one thousand six hundred prisoners, and the original Union line restored. The object of this move is not quite clear; it appeared to be but a raid on a large scale.

But Grant now was ready to move, and on the day before the attack on Fort Stedman he had issued detailed instruction to Generals Meade, Ord, and Sheridan. The final act of the long struggle between the Army of the Potomac and the Army of Northern Virginia was about to begin. Just before the movement commenced, the opposing forces were situated generally as shown on Sketch No. 1.

Part Two: The Appomattox Campaign

OPPOSING FORCES

UNION FORCES
Lieut. Gen. U. S. Grant

Army of the Potomac
Maj. Gen. George G. Meade

General Headquarters 6,000
Artillery (Hunt) 1,100
Siege Train (Abbott)
Arty. Reserve (Hays)
II Corps (Humphreys) 25,700
1st Div. (Miles)
1st Brig. (Scott)
2d Brig. (Nugent)
3d Brig. (Madill)
4th Brig. (Ramsey)
2d Div. (Barlow)
1st Brig. (Olmstead)
2d Brig. (McIvor)
3d Brig. (Smyth)
3d Div. (Mott)
1st Brig. (deTrobriand)
2d Brig. (Pierce)
3d Brig. (McAllister)
Arty. Brig. (Hazard)
V Corps (Warren) 20,700
1st Div. (Griffin)
1st Brig. (Chamberlain)
2d Brig. (Gregory)
3d Brig. (Bartlett)
2d Div. (Ayres)
1st Brig. (Winthrop)
2d Brig. (Denison)
3d Brig. (Gwyn)
3d Div. (Crawford)
1st Brig. (Kellogg)
2d Brig. (Baxter)
3d Brig. (Coulter)
Arty. Brig. (Wainwright)
VI Corps (Wright) 22,000
1st Div. (Wheaton)
1st Brig. (Penrose)
2d Brig. (Hamblin)
3d Brig. (Edwards)
2d Div. (Getty)
1st Brig. (Warner)
2d Brig. (Grant)
3d Brig. (Hyde)
3d Div. (Seymour)
1st Brig. (Truex)
2d Brig. (Keifer)
Arty. Brig. (Cowan)
IX Corps (Parke) 22,800
1st Div. (Wilcox)
1st Brig. (Harriman)
2d Brig. (Ely)
3d Brig. (Robinson)
2d Div. (Potter)
1st Brig. (Curtin)
2d Brig. (Griffin)
3d Div. (Hartranft)
1st Brig. (McCall)
2d Brig. (Mathews)

CONFEDERATE FORCES
Gen. R. E. Lee

Army of Northern Virginia
Gen. R. E. Lee

General Headquarters 700
I Corps (Longstreet)
Pickett's Div. 8,100
Steuart's Brig.
Corse's Brig.
Hunton's Brig.
Terry's Brig.
Field's Div. 5,600
Law's Brig.
Anderson's Brig.
Benning's Brig.
Gregg's Brig.
Bratton's Brig.
Kershaw's Div. 2,400
Wofford's Brig.
Humphrey's Brig.
Bryan's Brig.
Artillery (Alexander) 600
Haskell's Bn.
Huger's Bn.
II Corps (Gordon)
Grimes' Div. 4,300
Battle's Brig.
Grimes' Brig.
Cox's Brig.
Cook's Brig.
Early's Div. (Walker) 3,000
Johnston's Brig.
Lewis' Brig.
Pegram's Brig.
Gordon's Div. (Evans) 3,200
Evans' Brig.
Terry's Brig.
York's Brig.
Artillery (Long) 1,800
Braxton's Bn.
Cutshaw's Bn.
Hardaway's Bn.
Johnson's Bn.
Lightfoot's Bn.
Stark's Bn.
III Corps (A. P. Hill)
Heth's Div. 5,200
Davis' Brig.
Cooke's Brig.
MacRae's Brig.
McComb's Brig.
Wilcox's Div. 6,100
Thomas' Brig.
Lane's Brig.
McGowan's Brig.
Scales' Brig.
Mahone's Div. 5,400
Forney's Brig.
Weisiger's Brig.
Harris' Brig.
Sorrel's Brig.

Arty. Brig. (Tidball)
2d Pa. Cav. (Sanders)
Independent Brig. (Collis)

Army of the James
(Maj. Gen. E. O. C. Ord)
General Headquarters 1,700
Defenses of Bermuda Hundred ... 5,900
(Major General Hartsuff)
Infantry Div. (Ferrero)
1st Brig. (McKibbin)
2d Brig. (Kibbe)
Artillery (Abbot)
Separate Brig. (Carr)
XXIV Corps (Gibbon) 18,300
1st Div. (Foster)
1st Brig. (Osborn)
3d Brig. (Dandy)
4th Brig. (Fairchild)
3d Div. (Devens)
1st Brig. (Ripley)
2d Brig. (Donohoe)
3d Brig. (Roberts)
Independent Div. (Turner)
1st Brig. (Potter)
2d Brig. (Curtis)
3d Brig. (Harris)
Artillery (Abell)
XXV Corps (Weitzel) 14,300
1st Div. (Kautz)
1st Brig. (Draper)
2d Brig. (Wild)
3d Brig. (Thomas)
Attached Brig. (Russell)
2d Div. (Birney)
1st Brig. (Shaw)
2d Brig. (Doubleday)
3d Brig. (Woodward)
Arty. Brig. (Langdon)
Cav. Div. (Mackenzie) 3,600
1st Brig. (West)
2d Brig. (Spear)
Cavalry (Maj. Gen. P. H. Sheridan)

Army of the Shenandoah
(Maj. Gen. Wesley Merritt)
1st Cav. Div. (Devin) 3,400*
1st Brig. (Stagg)
2d Brig. (Fitzhugh)
3d Brig. (Gibbs)
3d Cav. Div. (Custer) 3,400*
1st Brig. (Pennington)
2d Brig. (Wells)
3d Brig. (Capehart)

Army of the Potomac
2d Cav. Div. (Crook) 8,600
1st Brig. (Davies)
2d Brig. (Gregg)
3d Brig. (Smith)
Totals 157,500
Guns 435*

*Estimated.

Finegan's Brig.
Artillery (Walker) 1,800
McIntosh's Bn.
Poague's Bn.
Richardson's Bn.
Pegram's Bn.
Washington's Bn.
Lane's Bn.
Anderson's Corps
Johnson's Div. 7,600
Wise's Brig.
Elliott's Brig.
Gracie's Brig.
Ransom's Brig.
Artillery (H. P. Jones) 1,200
Blount's Bn.
Stribling's Bn.
Coit's Bn.
Smith's Bn.
Cavalry Corps (F. Lee)
W. H. F. Lee's Div. 3,300
Barringer's Brig.
Beale's Brig.
Roberts' Brig.
F. Lee's Div. 2,600
Wickham's Brig.
Payne's Brig.
Gary's Brig.
Rosser's Div. 2,000
Dearing's Brig.
McCausland's Brig.
Artillery (Chew) 600
Breathed's Bn.
Chew's Bn.
Department of Richmond
(Lieut. Gen. R. S. Ewell)
G. W. C. Lee's Div. 3,000
Barton's Brig.
Crutchfield's Brig.
Artillery 900

Totals 70,900*
Guns 288*

*Estimated

GRANT'S PLAN

Grant planned to move to his left, with the double purpose of turning Lee out of the works before Petersburg, and supporting Sheridan in an effort to destroy the South Side and Danville Railroads. Sheridan, on accomplishing this, was to return to Grant or turn south and join Sherman, according to his own estimate of the situation at that time. The IX Corps was to remain in the trenches before Petersburg, and three divisions of the Army of the James were to hold the lines north of the Appomattox and James Rivers. The remainder of the Union forces was to move, on March 29, to turn the Confederate left. The commanders who remained behind were cautioned to keep a vigilant watch and take advantage of any weakening of the lines in their fronts. Grant apparently hoped for one or two things, or both, to happen, namely, to draw the Confederates from their trenches and beat them in open battle, or so to weaken their lines by detaching to the west flank that the Union forces that remained behind could capture Petersburg or Richmond without costly sacrifice.

LEWIS FARM

Grant's chief worry at about this time was that Lee would slip away before he could bring him to battle in the open. Therefore he started the initial movements on the night of March 27. Ord, with two divisions of the XXIV and one of the XXV Corps, with Mackenzie's cavalry division, marched from the extreme right of the Union line to Hatcher's Run, arriving there on the morning of the 29th. Sheridan had additional instructions not to cut loose from the main forces until he heard from Grant.

On the morning of March 29 the II and V Corps crossed Hatcher's Run and extended the Union lines to the Quaker Road, while Sheridan with the cavalry reached Dinwiddie Court House. Anderson had attacked the Union cavalry (Gregg's division) on the Boydton Plank Road, but without success. Also, Johnson's division had attacked Griffin beyond Gravelly Run, but had been repulsed.

Everything looked so favorable on the night of March 29 that Grant instructed Sheridan to operate with the main forces for the present, because, as he said, he felt "like ending the matter, if it is possible to do so, before going back."

On March 30 the II and V Corps swung round to a position practically astride the Boydton Plank Road, near its intersection with the Quaker Road. Lee moved five brigades under Pickett out to Five Forks to protect the South Side Railroad. Sheridan had moved up that way on the morning of the 30th, but had found the Confederates too strong to dislodge.

WHITE OAK ROAD

The Union forces were now in general line, from west to east: Sheridan, Warren, Humphreys, Ord, Wright, and Parke. On the morning of March 31 the V Corps advanced against the Confederate intrenched line on the White Oak Road. The attack was unsuccessful, and Warren was driven back in some confusion by a vigorous counterattack by Johnson. The II Corps, however, promptly came to his

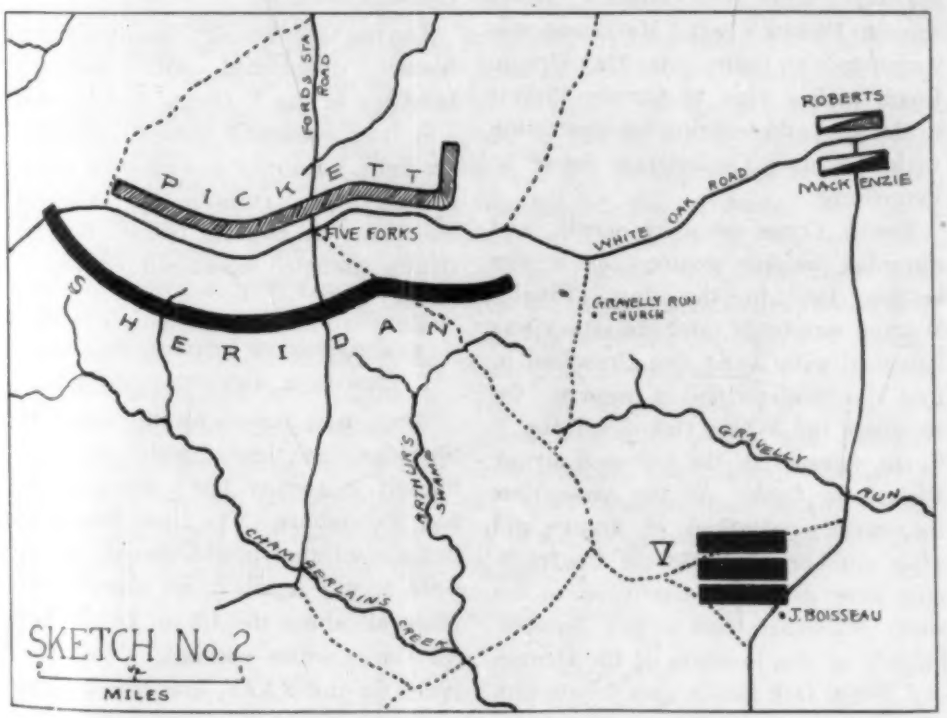
aid, striking Johnson in flank and driving him back to his own lines. Warren then advanced and regained his original position. During the night the V Corps was ordered to the support of Sheridan, who had been fighting at Dinwiddie Court House. The II Corps was ordered to take over as much of the V Corps line as could be accomplished with security.

DINWIDDIE COURT HOUSE

On the morning of March 31, Sheridan started the 1st Cavalry Division and part of the 2d toward Five Forks. About when the advanced units of the Union cavalry reached Five Forks, Pickett, supporting Fitz Lee's cavalry, met them and drove them back toward the Boydton Plank Road. The 1st Cavalry Division withdrew to the east, closely followed by Pickett. Sheridan now attacked from Dinwiddie Court House with the remainder of his cavalry, striking Pickett in flank and rear. Pickett promptly changed front and drove Sheridan back on Dinwiddie Court House, where darkness put an end to the fighting. Sheridan now concentrated his forces at Dinwiddie Court House, awaiting reinforcements that Grant had notified him were on the way. Pickett hearing of the movement of the V Corps towards his left flank, decided to withdraw to Five Forks to protect his connection with the railroad, and moved out at 1:00 a. m., April 1.

THE BATTLE OF FIVE FORKS

Sheridan, moving at daylight on April 1, drove the enemy's cavalry across Chamberlain Creek. The movement was accelerated by the knowledge



that two divisions of the V Corps were in their rear near J. Boisseau, with another coming up via the Boydton Plank Road. Sheridan halted the V Corps near J. Boisseau, and continued to press the Confederates back on Five Forks with his cavalry. At about this time Mackenzie's cavalry division reported to Sheridan, and was told to await orders at Dinwiddie Court House. By 2:00 p. m. Sheridan had driven the Confederates back to their intrenched position at Five Forks, and the situation was generally as shown in Sketch No. 2.

The V Corps was now ordered up via Five Forks and Gravelly Run Church, with instructions to form line of battle facing the White Oak Road. The cavalry was to demonstrate all along the line until the V Corps was in position, and then attack in conjunction with the latter's attack against Pickett's left. Mackenzie was instructed to move via the Crump Road, with a view to forcing Pickett to the west and severing his connection with the main Confederate forces in Petersburg.

The V Corps came up slowly, and Sheridan became anxious, as it was getting late in the day. Finally Warren was ready, and the attack was launched with Ayres and Crawford in first line and Griffin in reserve. On reaching the White Oak Road the V Corps wheeled to the left and struck Pickett in flank. At the same time the cavalry attacked in front, and after stubborn fighting the Confederates were driven in confusion to the west. Mackenzie had struck Roberts' brigade at the junction of the Crump and White Oak Roads, and driven him

toward Petersburg. Continuing on, he seized the crossing over Hatcher's Run on the Ford Road, thus completing the isolation of Pickett's forces. Between five and six thousand prisoners were taken, and the pursuit was pressed by Sheridan until after dark. At this time the situation was generally as shown on Sketch No. 3. Lee's laconic report reads: "Pickett's present position unknown."

During the attack Sheridan again became dissatisfied with Warren's handling of the V Corps, and relieved him from command immediately after the fight, authority having been issued in advance (unsolicited, remarks Sheridan) by General Grant. General Griffin assumed command of the V Corps.

EVACUATION OF PETERSBURG AND RICHMOND, AND THE PURSUIT

Grant now feared for the safety of Sheridan, so immediately bestirred himself to occupy Lee's attention before Petersburg. The lines were kept under continual bombardment, and at 4:00 a. m., April 2, an assault took place all along the Union front. The VI Corps broke through, closely followed by the XXIV, and, swinging to

the right, carried the Union line to the Appomattox and isolated the Confederates along Hatcher's Run. It was the beginning of the end. Lee now saw no prospect of holding his position longer than nightfall, and planned to concentrate near the Danville Railroad. He advised the authorities to prepare for an immediate evacuation of Petersburg and Richmond, and to direct all troops on Amelia Court House.

During the night of April 2 the Confederates evacuated Petersburg and Richmond, and retreated toward Danville. Grant pressed the pursuit on the morning of April 3; Sheridan, followed by the II and VI Corps, pushing for the Danville Road, while Ord moved on Burkeville along the South Side Road, followed by the IX Corps.

On April 4 Sheridan struck the Danville Road near Jetersville, and heard that Lee was at Amelia Court House. This move deprived Lee of the use of the railroad and any possibility of obtaining supplies from Danville. Nothing could be obtained from the country, so the route of the retreat was changed toward Farmville, where supplies had been ordered from Lynchburg. This change of route threw troops over to the roads in use by artillery and trains, and impeded the retreat and embarrassed movement.

Ord reached Burkeville on the evening of April 5. On the morning of the 6th it was found that Lee was moving west of Jetersville toward Danville. Sheridan and the VI Corps moved to strike his flank, while the II and V Corps pressed hard after him. Ord advanced from Burkeville toward Farmville, and succeeded in delaying the head of Lee's column at that place. In the afternoon Sheridan struck Lee's column south of Sailor's Creek, attacked the trains, and delayed the column until the VI Corps got up. A general attack was then launched, in conjunction with the II Corps, and Anderson's Corps and Ewell's forces were captured or driven from the field. The Union troops took some six or seven thousand prisoners at this point.

On April 7 the pursuit was renewed, and it was soon found that the Confederates had crossed to the northern side of the Appomattox River near Farmville. Lee had received and issued some supplies at the latter place, but the approach of the Union troops required the removal of the trains before all could be supplied. At this place Grant addressed a communication to Lee on the subject of surrender, and a corespondence ensued that resulted in the surrender two days later of the Army of Northern Virginia. During this time Lee had reached Appomattox Court House, and on the morning of April 9 found Sheridan, as well as the V Corps and Ord, barring his path. The II and VI Corps were close on his rear, and the long struggle was finished. The Army of the Potomac had finally overpowered the gallant Army of Northern Virginia.

CASUALTIES

(March 1 to April 9, 1865)

Union

Army of the Potomac	*K & W*	*M*	*Total*
General Headquarters	46	48	94
II Corps	1,973	772	2,745
V Corps	2,052	589	2,641
VI Corps	1,965	123	2,088
IX Corps	2,170	702	2,872
Cavalry	64	77	141
Independent Brigade	85	—	85
Totals	8,355	2,311	10,666
Army of the James			
General Headquarters	16	65	81
XXIV Corps	1,221	80	1,301
XXV Corps	52	46	98
Bermuda Hundred	40	44	84
Cavalry	51	30	81
Totals	1,380	265	1,645
Sheridan's Cavalry	1,104	227	1,331
Grand Total	10,839	2,803	13,642

Confederate

General Headquarters	419
I Corps	8,795
II Corps	6,252
III Corps	10,563
Anderson's Corps	6,449
Cavalry	6,941
Department of Richmond	3,640
Grand Total	43,059*

* This figure is the difference between the strength as of Feb. 28th, and totals surrendered on April 9th. The bulk of the losses were due to desertions.

NOTE: As no separate casualty lists are available for the opposing forces, the total casualties of both sides are given, for the purpose of comparison, for the entire period from March 1st to April 9th inclusive.

Notes from the Chief of Infantry

Commissioned Personnel, Office Chief of Infantry

Chief of Infantry

MAJ. GEN. STEPHEN O. FUQUA

Executive

COL. LORENZO D. GASSER

Section I—Personnel
COL. C. C. ALLEN
MAJ. E. F. RICE
MAJ. L. S. HOBBS

Section II—Intelligence
MAJ. T. B. CATRON
MAJ. S. J. CHAMBERLIN

Section III—Training and Inspection
LIEUT. COL. E. J. MORAN
MAJ. B. MAGRUDER
MAJ. C. H. BONESTEEL
CAPT. W. G. LAYMAN

Section IV—Arms and Equipment
LIEUT. COL. E. BUTCHER
MAJ. T. LAWRENCE
MAJ. J. D. PATCH
MAJ. H. TERRELL

Section V—Mobilization and Organization
COL. F. W. BUGBEE
CAPT. P. E. LEIBER

Hearings of Chief of Infantry Before Appropriations Committee

THE statement of the Chief of Infantry before the Appropriations Committee in the hearings on the Army Appropriation Bill for the fiscal year 1931 is quoted on next page.

The Chief of Infantry directly administers only the appropriations for the Infantry School, the Tank School, and the Office of Chief of Infantry. The appropriations for the support of the Infantry as a whole, including development, production, and supply of equipment, is directly administered by the supply services, although based on recommendations of the Chief of Infantry. While the hearings quoted herein concern primarily the expenses incident to the operation of the Infantry School (including the Department of Experiment), the Infantry Board, the Tank School, and the Tank Board, there is considerable information covering the general conditions of Infantry given by the Chief of Infantry in answer to questions by members of Congress who were taking this opportunity to familiarize themselves with these matters.

The statement of the general condition of Infantry as covered in the first few paragraphs is of absorbing interest. The full recognition given by

General Fuqua to the multiplicity of the tasks of the modern Doughboy as represented by his statement, "The Twelve-armed Doughboy," will be a source of satisfaction to all Infantrymen.

Thursday, December 12, 1929.

CHIEF OF INFANTRY

Statement of Maj. Gen. Stephen O. Fuqua, Chief of Infantry, accompanied by Maj. Henry Terrell, Jr., Office of Chief of Infantry.

GENERAL CONDITION OF INFANTRY

Mr. Barbour: General Fuqua, have you a general statement you wish to make for the record in regard to the Infantry? What would you say in a general way is the condition of the Infantry and its equipment at this time?

General Fuqua: I would say the condition of the Infantry is satisfactory. The morale is high, based upon efficient leadership, which is the essential requisite for high standards of pride of service and contentment. However, this morale factor is directly affected by such subfactors as pay, housing, rations, uniform, and amusements.

PAY QUESTION

The pay question is not for me to present, except to say that the evidence before me is convincing that the Army officer's pay should be increased; his maximum efficiency is difficult to attain under the present pay schedule.

HOUSING PROBLEM

The housing problem is a matter for others to present. I am sure, however, that an ultimate solution of this varied and difficult problem will do much toward improving the morale of our officers and men.

RATION PROBLEM

The ration problem has been solved by you gentlemen and your colleagues in giving us the fifty-cent ration. Every effort has been made to instruct our proper personnel in the handling of this ration and I can assure you gentlemen from my observations and the evidence obtained from others that this increase has done much toward improving the soldier's morale.

UNIFORM QUESTION

The uniform question is always important to us and I believe with the approval of the two tailor-made uniforms and the two war-time issues for one enlistment contained in the budget of the Quartermaster General will come a happy solution of the uniform problem until the time becomes opportune for including a blue uniform in the issue.

AMUSEMENTS

Amusements, which include athletics, are receiving much help from personal and local funds. A generous attitude toward this question will be appreciated by the service. I do not mean that this activity is lagging, but better results in future could be attained with a bit more equipment and apparatus.

SCHOOL SYSTEM

The school systems in the Infantry are giving great return on the time, energy, and funds invested in this educational activity. Our Infantry schools are excellent—and have received the praise not only of our Infantry officers but of all officers of the other arms whose mission has taken them to these institutions. I believe that our Infantry School stands second to none. It is due to this factor

more than any other why our efficiency standard is constantly increasing—for I believe that what the Benning and Meade schools are, so will be the Infantry. It is pleasing to recall that in all demands for officers on various duties with our civilian components the request is almost without exception that the officers be graduates of our school.

TRAINING OF INDIVIDUAL

The training of the individual in the Infantry is most satisfactory. Marked improvement is noted in infantry weapon firing and the progress is most marked in the new field of antiaircraft firing. However, unit training suffers through their dispersion into many small posts. This condition, for the time being, may be necessary, due to the housing problem and other factors over which we have no control. The difficulties and facilities for training vary greatly at the different posts and their geographical separation makes it difficult to bring battalions and regiments and brigades together for unit training.

ARMS AND EQUIPMENT

As to arms and equipment, it is not generally known of the many weapons with which the infantry soldier is armed and with which he must become efficient. These arms consist of rifle, bayonet, pistol, automatic rifle, caliber .50 machine gun, caliber .30 machine gun, infantry mortar, 37-mm. gun, hand grenade, rifle grenade, smoke candles, and the tank. Because of this fact the infantry soldier may be referred to as the twelve-armed "Doughboy."

The infantry soldier is no longer merely a rifle bearer in combat. The requirements for a good infantry soldier are exacting, demand technical skill of many, initiative and intelligence in their work to lead and fight in the van of our army. He is the only soldier of our army that actually faces the enemy in final combat, and he suffers the greatest of losses in his mission of gaining and holding ground and breaking down enemy resistance. When he loses the fight, the battle is over; when he wins, the army is victorious. I pay tribute to the other arms and services—but only that they serve this ground soldier—for all others are subordinate to him and unless their mission is to aid this soldier it is generally recognized that they have no place in our Army.

The major items of arms and equipment now in the hands of the Infantry arm are the same as were used in the World War. Satisfactory progress has been made since the war in the improvement of existing arms and the development of new weapons. Due to the large amount of war stocks on hand, it will probably be some time before new weapons will be produced in quantities sufficient to equip even the Regular Army Infantry. It is not intended to convey the impression that the weapons now in the hands of the Infantry are out of date. These weapons are most efficient and compare favorably with infantry arms in use by the armies of the world.

DEVELOPMENT IN INFANTRY ARMS AND EQUIPMENT SINCE THE WAR

The principal development in infantry arms and equipment since the war include the following:

The adaptation of the present arms for use in antiaircraft fire.

The development of a semiautomatic shoulder weapon to replace the caliber .30 bolt-action rifle.

The development of a light machine rifle.

Development of air-cooled barrel for the caliber .30 and caliber .50 machine guns.

The development of a new 37-millimeter gun and a new 75-millimeter infantry mortar.

The development of armor-piercing ammunition for both small arms and the 37-millimeter gun.

The development of a light and medium tank.

The development of battlefield cargo and personnel carriers.

The development of smoke producing materiel and apparatus.

The development and use of motor transportation possessing cross-country mobility for use in replacing and augmenting animal-drawn transportation in the Infantry regiments.

The development of an improved helmet giving greater comfort and more protection.

The development of a gas mask that gives greater vision, is more comfortable and is impervious to water.

In addition to these more or less major projects, our Infantry Board is engaged in the study of some fifty other projects of the different supply branches which pertain to the Infantry, viz: Ordnance, eighteen projects; Quartermaster, fourteen projects; Signal Corps, twelve projects; Chemical Warfare, five projects; Engineer, one project.

Mr. Barbour: We will take up the items separately.

General Fuqua: The appropriations this year were divided into two items, one for the Infantry School and the Department of Experiment, including the Infantry Board, all of which are stationed at Fort Benning, and the tank service, which includes the Tank School and Tank Board, stationed at Fort Meade.

The estimate for 1931 is thirty-eight thousand four hundred and thirty-three dollars for the Infantry School, which is an apparent increase of ninety-one dollars over the 1930 appropriation. I say apparent increase because an item of eight hundred dollars which heretofore has been carried in the Engineer budget is now in the Infantry budget.

INFANTRY SCHOOL AT FORT BENNING, GA.

Mr. Barbour: The thirty-eight thousand four hundred and thirty-three dollars for the Infantry School at Fort Benning is for the purchase of textbooks, books of reference, scientific and professional papers, instruments and material for instruction, employment of temporary, technical, special and clerical services, and for the necessary expenses of instruction at the Infantry School.

That does not have anything to do with other expenses of the school down there, other than enumerated in this item?

General Fuqua: No, sir; it does not; the item covers the contingent expenses only as enumerated in the five projects—personnel, supplies and materials, communications, repairs and alterations, and purchase of new equipment.

NUMBER OF OFFICERS ATTENDING SCHOOL

Mr. Barbour: How many students are attending the Infantry School, both officers and enlisted men?

General Fuqua: We have at present three hundred and forty-two officers and sixty-five enlisted men; one hun-

dred and fifty-nine of the three hundred and forty-two officers are National Guard and Organized Reserve officers, and forty-five of the enlisted men are from the National Guard.

Mr. Barbour: Can you give us the number of National Guard and Reserve officers separately?

Major Terrell: We have not that information right now because we do not know the exact number who are going there. The course opens after Christmas. We group them together in one course.

Mr. Barbour: What is the number in the group?

General Fuqua: The number in the group is one hundred and fifty-nine.

Major Terrell: I can say that the majority of those officers are National Guard officers.

General Fuqua: I know they are; I was present at their graduation exercises in June, and the number this year will be approximately the same.

INSTRUCTION GIVEN AT SCHOOL

Mr. Barbour: Just what instruction is given there at the Infantry School, in a general way?

General Fuqua: Generally speaking, the instruction includes the tactics and technique of the Infantry arm, including communications, supply, reconnaissance, training methods, and equitation.

Mr. Barbour: Everything that the Infantry is supposed to do is taught there, or practically everything?

General Fuqua: Practically everything that the Infantry officer has to know concerning the tactics and technique of his own arm to include the brigade. Our basic reason for having the school is to develop officers as instructors for the Regular Army, National Guard, and Organized Reserves, and the Reserve Officers' Training Corps, and the Citizens' Military Training Camps. I might say that the school in this respect is performing its mission, evidenced by most of the requests that come to us for officer details containing the provision that the officer shall be a graduate of the Fort Benning School.

Mr. Barbour: You mean requests for what officers?

General Fuqua: For duty with the National Guard, Organized Reserves, Reserve Officers' Training Corps, and the Citizens' Military Training Camps.

CONSTRUCTION OF BARRACKS AT FORT BENNING

Mr. Clague: You spoke about having visited Fort Benning in June. Some of the barracks were about completed when you were there, were they not?

General Fuqua: Those were the barracks in which the tank unit will be housed; they were nearing completion.

Mr. Clague: What have you to say about them?

General Fuqua: I think from all I have heard that they are splendid barracks and will certainly meet the requirements of the organization that expects to be housed in them.

Mr. Clague: Did you visit any of them yourself?

General Fuqua: Yes, sir. I went through the new barracks occupied by the 29th Infantry.

Mr. Clague: And in your opinion they are very satisfactory?

General Fuqua: I would make one criticism in connection with the construction of the barracks, particularly

with reference to the storerooms. The storerooms are in what we would normally call the attic of the building, which, of course, makes it difficult to handle supplies, being in that part of the building.

The amusement rooms are on one of the upper floors when they should be lower down, I think. They are on the third floor instead of being on the first floor, so as to encourage the men to use them.

Mr. Taber: Have you transmitted your criticism of the barracks to the Quartermaster General's office?

General Fuqua: That criticism has beeen transmitted by others.

Mr. Clague: How many men are there altogether at Fort Benning?

General Fuqua: The entire population of the garrison is six thousand five hundred. Of course, that includes women and children. The military strength is six hundred and fifty-two officers and four thousand six hundred and ninety-five enlisted men.

Mr. Barbour: How is your building program getting along there; is it all right?

General Fuqua: Yes, sir. We have five hundred thousand dollars this year, three hundred and seventy thousand dollars for the officers' quarters and one hundred and thirty thousand dollars for the noncommissioned officers' quarters. Those plans have all been examined by everybody responsible, and I think they have met with the approval of all concerned before the construction started.

STRENGTH OF INFANTRY

Mr. Barbour: What is the strength of the Infantry at this time, General?

General Fuqua: There are in the Infantry three thousand seven hundred and seventeen officers and forty-one thousand four hundred and ninety-two enlisted men, exclusive of the Philippine Scouts, who number two thousand three hundred and seventy-one.

Mr. Barbour: That is in the Infantry?

General Fuqua: Yes. That gives a total of forty-three thousand eight hundred and sixty-three enlisted men.

Mr. Barbour: How many men per regiment have you now, and how many regiments of Infantry are there?

General Fuqua: We have thirty-eight active regiments of Infantry, twenty-seven of which are within the continental limits of the United States, and eleven are on foreign service.

Mr. Barbour: What is the strength of a regiment?

General Fuqua: The modified peace strength is fifty-eight officers and one thousand one hundred and fifty-five men, which, of course, is increased for war strength.

DESIRABILITY OF NEW BLUE UNIFORMS TO BE ISSUED

Mr. Barbour: Would the Infantry be glad to get the new blue dress uniform that has been talked about?

General Fuqua: I believe the Quartermaster's budget this year included two of the tailor-made olive drab uniforms and two of the stock issues, which, if approved, I believe will be acceptable to all of us at this time, until the moment is opportune for a blue uniform.

Mr. Barbour: When do you think that moment will be opportune?

General Fuqua: I think it is a ques-

tion of money, as far as I know. I think the Service is ready for it.

Mr. Barbour: You think, General, that the Service will be pleased to have the blue uniform?

General Fuque: I think the Regular service will be pleased, and I think the National Guard service will be pleased, from my contact with them.

EFFECT OF INCREASED RATION ALLOWANCE ON MORALE OF ARMY

Mr. Clague: In speaking about the general condition of the Infantry, you referred to the food. What have you to say about the food?

General Fuqua: I will say, sir, that I have had an unusual opportunity of visiting many of the army messes, and in all probability I have inspected as many as a hundred in the last few years.

Mr. Clague: I am referring to the food that has been served particularly since the new ration went into effect.

General Fuqua: I am satisfied that there is nothing that has been brought about in the Army that has done any more toward producing contentment, and therefore, morale, than the fifty-cent ration.

The Army has gone about taking advantage of this increase in a very businesslike way. Both the officers and enlisted men who are responsible for the ration and its final preparation for the soldier have received additional instruction in its handling and are getting the very best out of it.

TANK SERVICE

Mr. Barbour: For the tank service the estimate calls for twenty-five thousand two hundred and twenty dollars for 1931, as compared with an appropriation for the current year of twenty-six thousand three hundred and thirteen, or a decrease of nine hundred and ninety-three dollars.

General Fuqua: That is occasioned by combining the work done by the mechanics so that we could get rid of one mechanic, which gave us a saving of two thousand thirty-three dollars. The salaries of eight of the employees are increased by one hundred dollars per annum and four employees by sixty dollars per annum, which made one thousand forty dollars, leaving us a net saving of nine hundred and ninety-three dollars.

Mr. Barbour: This pays for the civilian employees?

General Fuqua: That is the biggest item.

Mr. Barbour: Where are they located?

General Fuqua: There are eight mechanics, who are also instructors, and two clerks located at Fort Meade and two clerks in the office, Chief of Infantry.

Mr. Barbour: Where are they?

General Fuqua: Those at Meade are employed in the school.

Mr. Barbour: Where is the school?

General Fuqua: It is at Fort George G. Meade, Md.

Mr. Barbour: That is for the Tank School?

General Fuqua: Yes, sir.

Mr. Barbour: How many do you have attending that school?

General Fuqua: We have increased the course during this last year and now have sixty-two student officers—ten of whom are Reserve officers.

Mr. Barbour: How many enlisted men?

General Fuqua: One hundred and thirty-three enlisted men students. This, of course, does not include the enlisted men of the tank units stationed at the school.

Mr. Barbour: How many instructors are there?

General Fuqua: Fifteen.

Mr. Clague: Have you anything to say about the new tanks?

General Fuqua: I can say we are now just completing the final test of the so-called T-1-E-2 tank, which is a slight modification of the Ordnance T-1-E-1 tank. That tank was sent to us about a week ago, and the complete testing of it will not be over until some time in the latter part of this month.

Mr. Clague: Have you tested out the new Christie tank there?

General Fuqua: To a limited degree. We have had what is called the tactical test, but the Ordnance Department has not given it a mechanical test. Our test has shown it to be a very satisfactory tank weapon, and we are hoping in the new Christie construction, in which Mr. Christie has promised to meet the conditions of the tank board, that we will have a tank that will answer our requirements.

Mr. Taber: What about the T-1-E-1?

General Fuqua: Tactically it has not met our requirements, based upon the tests of the tank board. Mechanically it is a very wonderful machine.

Mr. Taber: What is the trouble with it?

General Fuqua: The trouble is due to the fact that the engine is in front instead of the rear. Placing the engine at the front end of the tank brings the heat of the engine, and the smoke and gas fumes in front of, and close to the driver and the gunner; tends to interfere with the vision of both; increases the danger to the crew from a fire in the engine compartment; places the driver so far back from the front end of the tank that he can not see the ground immediately in front of the tank; and places the gunner toward the rear of the tank where he receives the maximum pitch of the tank in traveling over even the smallest inequality of the ground.

Placing the engine at the rear end of the tank tends to keep the heat of the engine, smoke and gas fumes away from the crew, reduces the danger to the crew in case of fire in the engine compartment, enables the driver to be placed in the front end of the tank where he can see the ground immediately in front and at the sides of the tank, and enables the gun and gunner to be located (in small tanks) at the most advantageous positions.

Mr. Taber: That means that you would not want to order any more of them?

General Fuqua: No, sir.

Mr. Taber: Does the Christie have the same objection?

General Fuqua: No, sir.

INCIDENTAL EXPENSES OF TANK SCHOOLS

Mr. Barbour: For incidental expenses you are asking for one thousand eight hundred and seventy dollars for 1931. That is an increase of five hundred and seventy dollars as compared with the appropriation for the current year?

General Fuqua: Yes, sir.

Mr. Barbour: Just what is covered by incidental expenses, General?

General Fuqua: That is due principally to the increase in the size of

our class which made necessary workbench tools so that each student officer would have the necessary equipment to carry on his practical work. One hundred and thirty-five dollars of that amount is due to the necessity for increasing our library, adding books of a scientific and technical nature.

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Rosters of Officers, Infantry Regiments and Brigades

All rosters are as of December 31, 1929, with the following exceptions: November 30, 1929, 15th Infantry, 21st Infantry, 27th Infantry, 31st Infantry, 35th Infantry, 45th Infantry, 57th Infantry, 11th Tank Company, 21st Brigade, 22d Brigade, 23d Brigade, 19th Brigade; October 31, 1929, 19th Infantry.

1st Brigade
Ft. Wadsworth, N. Y.

BRIGADIER GENERAL
Rosenbaum, O. B.

MAJOR
Orton, W. R.

CAPTAIN
Gibson, H. D.

1ST LIEUTENANTS
Cookson, F. H.
Kean, W. B., Jr.

2d Brigade
Madison Bks., N. Y.

BRIGADIER GENERAL
Jackson, W. P.

MAJORS
Uhl, F. E.
Mann, W. R.

1ST LIEUTENANTS
Jenkins, E.
Larr, D. (FA)

3d Brigade
Ft. Sam Houston, Texas

BRIGADIER GENERAL
Cocheu, F. S.

MAJOR
Lyman, E. J.

CAPTAINS
Partridge, F. H.
Thompson, J. W.

1ST LIEUTENANT
Chapman, C. P.

2D LIEUTENANT
Aloe, R. C.

4th Brigade
Ft. F. E. Warren, Wyo.

BRIGADIER GENERAL
Howland, C. R.

LT. COLONEL
Lawrason, G. C.

CAPTAIN
Martin, M. C.

1ST LIEUTENANTS
Foss, S.
Read, G. W., Jr. (Cav.)

2D LIEUTENANT
Stanton, W. C. (FA)

5th Brigade
Vancouver Bks., Wash.

BRIGADIER GENERAL
Wolf, P. A.

CAPTAINS
Henderson, H. M.
Bender, J. D.

1ST LIEUTENANTS
Dodd, F. T. (FA)
Dorrien, H. C.

6th Brigade
Ft. Rosecrans, Calif.

BRIGADIER GENERAL
Shaw, G. C.

LT. COLONEL
Peyton, P. B.

CAPTAIN
Adamson, H.

1ST LIEUTENANT
Springer, R. M.

8th Brigade
Ft. McPherson, Ga.

BRIGADIER GENERAL
Estes, G. H.

MAJOR
Allen, O.

CAPTAIN
Smith, O. S.

1ST LIEUTENANTS
Winn, W. S.
Landon, C. R.

10th Brigade
Ft. Ben. Harrison, Ind.

BRIGADIER GENERAL
Jamerson, G. H.

MAJOR
Hazlett, H. F.

CAPTAINS
Crim, S. M.
Johnson, R. A.

1ST LIEUTENANTS
Harper, J. H.
Sears, R. (FA)

12th Brigade
Ft. Sheridan, Ill.

BRIGADIER GENERAL
Conrad, C. H., Jr.

LT. COLONEL
Binford, R. J.

CAPTAIN
McCord, W. D.

1ST LIEUTENANTS
Bush, H. C.
Keeley, J. T.

14th Brigade
Ft. Omaha, Nebr.

BRIGADIER GENERAL
Eltinge, LeR.

MAJOR
Kelleher, W. P.

1ST LIEUTENANTS
Smith, L. W. (Cav.)
Bolt, J. L.
Keerans, C. L.
Jones, H. C.

16th Brigade
Ft. Hunt, Va.

BRIGADIER GENERAL
Williams, H. O.

LT. COLONEL
Emery, A. R.

MAJOR
Duffy, Ralph, (MC)

CAPTAINS
Stroh, D. A.
Daniels, M. S., (Jr.) (Cav.)
Adamson, G. E. (QMC)
FitsGerald, E. J. M.

1ST LIEUTENANTS
Kimball, E. A.
Wedemeyer, A. C.

18th Brigade
Ft. Rodman, Mass.

BRIGADIER GENERAL
Walker, Meriwether L.

CAPTAINS
Barker, G. R.
Chapman, A. G.

1ST LIEUTENANT
Mahoney, P. H.

2D LIEUTENANT
Chase, R.

19th Brigade
Gatun, Canal Zone

MAJOR
Evans, V.

CAPTAINS
Foreman, T. W.
Olmstead, M. E.

21st Brigade
Schofield Bks., T. H.

BRIGADIER GENERAL
Reeves, J. H.

MAJOR
Bagby, C. A.

CAPTAINS
Gibson, J. H.
Trechter, O. E. C.

1ST LIEUTENANT
Browder, W. F.

2D LIEUTENANT
Renfro, C. D.

22d Brigade
Schofield Bks., T. H.

BRIGADIER GENERAL
Barnhardt, G. C.

MAJOR
Waltz, F. R.

CAPTAINS
McCreight, W. V.
Hedge, G. R.
Rolfe, O. S.

1ST LIEUTENANTS
Culton, H. G. (Cav.)
Dumont, F. G.

23d Brigade
Ft. Wm. McKinley, Philippine Islands

BRIGADIER GENERAL
Collins, E. T.

MAJOR
Dook, L. H.

CAPTAINS
Lennon, B. N.
Carter, J. D.

1ST LIEUTENANT
Strohbehn, E. L. (FA)

1st Infantry
Ft. Francis E. Warren, Wyo.

COLONEL
Hanigan, H. A.

LT. COLONELS
O'Loughlin, W. J.
Bubb, J. P.

MAJORS
Montesinos, S. M.
Pigott, W. T., Jr.

CAPTAINS
Stanley, J. W.
Galliett, H. H.
James, V. L., Jr.
Bartow, D. M.
Buchanan, M. V.
Adair, H. D.
Wilkins, R.
Andrews, A. E.
Peixotto, E. M.
Harrison, W. F.
Marshall, P. G., Jr.
Murphy, J. J.
Love, R. F.
Johnson, J. S., Jr.
Pence, A. B.

1ST LIEUTENANTS
Edens, J.
Killen, W. D.
Nichols, A. R.
Beckett, R. C.
Willis, J. B.
Hodson, F. B.
Whitlow, A. B.
Alexander, M.
DeWitt, W. W.
Stephens, L. E.
Seebach, C. M.
Buck, W. A.

Absent:
Francis, D. T.

2D LIEUTENANTS
Gamble, A. S.
Holland, J. F.
Mitchell, P. J.
Carpenter, R. C.
Lynde, N. M., Jr.

2d Infantry
Ft. Wayne, Mich.

COLONEL
Shaw, F. S.

CAPTAINS
McLendon, E. L.
Solderholm, N. L.
Alfonte, D. R.
Haskins, E. H.
Doane, I. E.
Urquhart, J. R.
Dooley, H. E.
Smith, W. L.
Anderson, K. S.
Renth, R. L.

1ST LIEUTENANTS
Kunz, B. W.
Nesbit, R. L.
Gould, H. W.
Pughe, K. F.
Gooler, M. H.
Carnes, J. J.

2D LIEUTENANTS
Beattie, R. B.
Boos, F. H.
Wilson, W. C.

Ft. Brady, Mich.

LT. COLONEL
Cole, O. R.

MAJOR
Halpine, K. M.

CAPTAINS
Norris, G. B.
Cohn, L. F.
Collette, W. H.

1ST LIEUTENANTS
Oliver, M. F. W.
Tomey, W. R.
Evans, J. P.

Ft. Sheridan, Ill.

MAJORS
Waite, S.
Cotton, J. W.

CAPTAINS
Campbell, P. S.
Coughlin, J. V.
McKay, W. R.
Fleming, W. R.
Hazelrigg, W. R.

1ST LIEUTENANTS
Durrette, M. S.
Neff, M. C.
Perwein, A. H.

2D LIEUTENANTS
Cooper, R. C.
Pierce, R. J.

3d Infantry
Ft. Snelling, Minn.

COLONEL
Sweeney, W. C.

LT. COLONELS
Grey, B. E.
Lentz, B.

MAJORS
Reinhardt, E. F.
Keeley, H. J.
Navas, M. B.

CAPTAINS
Fischer, H. E.
Jones, C. H.
Hendrickson, C. S.
Cody, J. C.
Linden, H.
Robertson, H. S.
Millard, W. W.
Fowle, D. G.
Dyer, F. V. M.
Oseth, I. M.
Frakes, E. M.
Ackerson, M.
Arnold, R. F.
Speece, N. W.
Boyers, J. A.
Gorman, J. J.
Jensen, H. T.
Townsend, G. R.

1ST LIEUTENANTS
Davidson, O. L.
Dukes, T. A.
Newell, H. F.
Zak, J. T.
Kline, K. E.
Zimmerman, W. C.
Boyle, G. L.
Watson, N. A.
Fish, J., III
Dicks, J. L.
Skinner, L. L.
Smith, D. B.

Absent:
Miller, W. R.

2D LIEUTENANTS
Charles, G. C.
Loyd, F. R.
Grizzard, H. M.
Thiebaud, K. E.
Zwicker, R. W.
Moscatelli, T. T.
Douglas, G. A.
McNerney, J. A.
Conner, G. F.

4th Infantry
Ft. George Wright, Wash.

COLONEL
Partello, J. K.

MAJOR
Eberle, S. S.

CAPTAINS
Morse, W. P.
Luck, H. C.
Blair, N.
Estill, D. H.
Orsinger, R.
Randolph, G. N.
Spooner, L. S.
Uhrig, J. E.

1ST LIEUTENANTS
Howie, R. G.
Sanders, A. D.
Lewis, J. A.
Maertens, K.
Chrisman, O. G.
Wright, E. K.

2D LIEUTENANTS
Smithers, S. W.
Chrisman, H. F.
Deyo, W. J., Jr.
Doty, R. E.

Ft. Lincoln, N. D.

LT. COLONEL
Alfonte, W. A.

CAPTAINS
Kupfer, A. K.
Anderson, G. A. M.
Tourtillott, R. R.
Ross, C. A.

1ST LIEUTENANT
Pangburn, E. D.

2D LIEUTENANTS
Bleakney, W. R. F.
Bergquist, E. C.
Prunty, C. H.
Willette, G. C.
Trotter, L. T. R.

Ft. Missoula, Mont.

MAJOR
Gonser, G. J.

CAPTAINS
Foster, A. D.
Fisher, G.
Pomerene, J. D.

1ST LIEUTENANTS
Rothermich, A. E.
Alexander, F. M.
Nist, G. W.

2D LIEUTENANTS
Enger, E. E.
Underwood, J. W.
Barnes, G. R.
Kinnee, D. J.

5th Infantry
Ft. Williams, Me.

COLONEL
Bennett, L. C.

MAJORS
Fletcher, A.
Adams, W. F.

Absent:
Bell, R. D.

CAPTAINS
Knight, A. S.
Cawthorne, T. H.
Ready, J. L.
Frissell, H. N.
Lummis, I. L.
Behan, E. V.
Hea, J. J.
Lull, T. C.

1ST LIEUTENANTS
Brown, J. A.
Sullivan, A. F.
Collins, L. C.
Stevens, B. G.

2D LIEUTENANTS
Cummings, E. A.
Babb, R. L.

Ft. McKinley, Me.

LT. COLONEL
Nolan, D. A.

MAJORS
Garrison, D. G. C.

Absent:
Hathaway, L. R.

CAPTAINS
Fainter, F. F.
Coulter, C. S.
Ross, F.
Butler, J. F.
Haycock, C. P.
Schlaepfer, R. K.
Bonnett, D. V. N.
Milan, H. L.
Kershaw, C. C.

1ST LIEUTENANTS
Cooey, A. W.
Johnston, H. D.

2D LIEUTENANTS
Kernan, P. M.
McNickle, S. P.
MacLaughlin, P. E.

Ft. Preble, Me.

CAPTAIN
Oliver, M. G.

2D LIEUTENANT
Merchant, E. F.

6th Infantry
Jefferson Bks., Mo.

COLONEL
Whitworth, P.

LT. COLONEL
Randolph, J.

MAJORS
Ford, L. P.
Underwood, A. R.
Tipton, A. C.

CAPTAINS
Grimmer, E. W.
Ross, G. A.
DeVall, J. R.
Carlin, T. G.
Croonquist, A. P.
Zuppann, L.
Hutchinson, A. G.
Connolly, J. L.
Backman, S. G.
Sandusky, R. M.
Walker, S. P.
Sperati, P. H.
Bassett, A. J.
Sunstone, J. T.

1ST LIEUTENANTS
Broedlow, R. W.
Eason, J. D.
Judd, J. H.
Ancker, C. J.
Howat, J. B.
Vesey, R. H.
Odor, R. W.
Smith, N. A.
Sutherland, E. M.
Halter, B. S.
Garvin, C.
Hilliard, L. L.
Higgins, C. C.

Absent:
Overfelt, C. D.
Collins, C. D.

2D LIEUTENANTS
Schanze, A. E.
Matthews, W. S.
Hasting, H. H.
Halterman, H. W.
Howard, C. F.
Crandall, R. G.
Greeley, B. M.

Absent:
Griffith, W. B.
Stephanson, J. O.

7th Infantry
Vancouver Bks., Wash.

COLONEL
Rowell, F. W.

LT. COLONEL
McCammon, E. E.

MAJORS
Jones, A. M.
Lester, G. W.

Absent:
McMurray, C. M.

CAPTAINS
Hayden, C. H., Jr.
Humphries, O. W.
Casey, J.
Birks, H. D.
Hutchin, C. E.
Henkle, H. L.
Byerly, F. S.
Ware, R. L.
Strain, J. F.
Platts, W. A.
Isbell, H. W.

Absent:
Worthley, L. E.

1ST LIEUTENANTS
Babbitt, R. C.
Yeates, J. J.
Smith, C. R.
Cross, T. J.
Ferenbaugh, C. B.

Horne, J. C.
Carrington, G. C.
Burgess, H. F.
Sloan, E. F.
Ohrbom, V. T.
Harding, H. J. P.
Beeler, D. T.
Bing, R. C.

2D LIEUTENANTS

Purdue, B. P.
Dobak, A. A.
Dressler, J. F.

Absent:

Wadman, J. F.

Chilkoot Bks., Alaska

MAJOR

Spalding, B. D.

CAPTAINS

Bogan, L. C.
Amis, L. W.

1ST LIEUTENANTS

Doty, K.
Jackson, E. B.
Bottomley, T. A.

2D LIEUTENANTS

Roberts, H. V.
Ringler, E. L.

8th Infantry
Mt. Moultrie, S. C.

COLONEL

Coleman, W. P.

MAJOR

Warren, S.

CAPTAINS

Lindsey, M. F.
Helmbold, P. A.
Ellis, D. M.
Philips, W. C.
McGee, A. P.
Richey, W. R., Jr.

1ST LIEUTENANTS

Purswell, S.
Smith, C. M., Jr.
Wallis, L. D.
Bowen, J. E., Jr.

2D LIEUTENANTS

Bailey, K. R.
Felber, J. G.
Gude, E. W.
Tarpley, T. M.
Strader, R.
Smothers, T. B., Jr.

Ft. Screven, Ga.

LT. COLONEL

Wilson, E. M.

MAJOR

Sibert, F. C.

CAPTAINS

Wright, R. L.
Hammond, C. G.
Wheeler, H. B.
Whittemore, K. S.
Cameron, A. D.

1ST LIEUTENANTS

Kelly, P. C.
Knight, D. B.
Marron, C. Q.

2D LIEUTENANTS

McKinney, H. E.
Johnston, K.
Baltzell, G. F., Jr.
Mays, S. E., Jr.

Absent:

Montgomery, H.E., Jr.

9th Infantry
Ft. Sam Houston, Tex.

COLONEL

Weeks, G. M.

LT. COLONEL

Kelly, J. R.

MAJORS

Bennett, L. B.
Murray, P.
Stocker, B. S.
Bishop, C. A.

Attached:

Buerkle, W.
Lancaster, J. L.

CAPTAINS

Christie, A. F.
Keiser, L. B.
Savelle, M. D.
Moore, J. P.
White, H. K.
Fisher, R. K.
Gillis, M. A.
Chester, E. W.
Craig, W. M.
Cordero, V. N.
Starkey, J. W.
Boylan, R.
Logan, P. P.
Winston, B.
Sapia-Bosch, T.
Gregorie, E. M.
Robertson, S. C.

1ST LIEUTENANTS

Collins, P.
Taylor, P. R.
Alexander, I.
Dalbey, J. T.
Hamilton, J. R.
Murphy, R. V.
Vincent, S. T.
Harmony, J. W.
Lancaster, N., Jr.
Pearce, C. N.

Absent:

Hosen, S. W.

2D LIEUTENANTS

Graybeal, C. S.
Todd, F. A.
Loughborough, D. S.
Thorpe, F. L.
Wiseman, V. H.
Baker, G. W.
Middlebrooks, R. R.
Wiesenauer, R.
Freeman, P. L., Jr.
Wright, E., Jr.
Buck, L. N.
Smith, R. V.
Longaker, N. S.

10th Infantry
Ft. Thomas, Ky.

COLONEL

Young, F. S.

LT. COLONELS

Hickox, A. A.
Bowman, E. E.

MAJOR

Crea, H. B.

CAPTAINS

McKee, J. L.
Fairchild, R. F.
Crose, J. O.
Neundorfer, O. J., Jr.
Smith, R. B.
Miller, R. S.
Hagens, J. M.
Williams, T. H.

1ST LIEUTENANTS

Miller, W. B.
Banks, C. G.
Evans, A. J.
Brann, D. W.
Thompson, F. M.
Moore, J. E.
Kernan, G. M.

2D LIEUTENANTS

Thompson, J. V.
Fritzsche, C. F.
Ivy, J. M.
Bryan, J. K.

Absent:

Nourse, K. E.

Ft. Hayes, O.

LT. COLONEL

Maghee, T. B.
(Attached)

CAPTAINS

McCormick, J. W.
Williams, C. L.
Jones, P. S.
Stafford, B. F.

1ST LIEUTENANTS

Canary, J. E.
Post, E. D.
Porch, P. K.
Raymond, A. D., Jr.

2D LIEUTENANTS

McGinness, J. R.
Farra, J. F.

Absent:

Wetherill, R., Jr.

Camp Knox, Ky.

CAPTAIN

Bartley, W. L.

1ST LIEUTENANT

Brinson, J. F.

2D LIEUTENANT

McKee, M.

11th Infantry
Ft. Benjamin Harrison, Ind.

COLONEL

Hobbs, H. P.

LT. COLONEL

Musgrave, T. C.

MAJORS

Cleary, A. W.
Edgerly, J. P.
Starlings, P. N.

CAPTAINS

Gammon, J. P.
Esden, H. G.
Edwards, R. F.
Schucker, F. R.
Blizzard, J. C., Jr.
Dalton, W. F.
Wilson, C. H.
Hanley, J. F.
Strong, P. D.
Cloud, H. H.
Hollingsworth, G. C.
Gibson, T. R.
Macy, L. D.
Carter, P. D.

Absent:

Bush, N. G.

1ST LIEUTENANTS

Drake, J. H.
Gahan, J. J.
Harris, J. G.
Mallory, F. N.
Cooley, K. P.
Oberst, F. X.
Wolf, A. H.
Van Duzee, F. P.
Hulett, C. T.
Reid, A. D.
Cunkle, A. C.
Dulaney, R. L.

Absent:

McDavid, J. B.

2D LIEUTENANTS

Graling, F. J.
Harvey, D.
Smith, J. M.
Canham, C. D. W.
Rumbold, R. E.
Sherburne, T. L., Jr.
Bush, G. E., Jr.
Ward, R. W.
Treat, C. H.

Absent:

Hickey, A. N.

12th Infantry
Ft. Howard, Md.

COLONEL

Fries, C. S.

MAJOR

Purdon, F. L.

CAPTAINS

Brown, F. C.
Coffin, F. P.
Duke, R. T. W.
Ellis, C. L.
Finley, N. D.
Kent, H. T.
Sharpless, F. E.

1ST LIEUTENANTS

Blakely, W. R.
Coursey, R. R.
Smith, C. R.
Torovsky, R. H.
Yancey, W. J. T.

2D LIEUTENANTS

Conley, E. T.
Donald, W. D.
Lynch, B. A., Jr.
Lynch, C. A.
Upham, J. S.
VanBibber, E. M.
Wiegand, C. D.

Ft. Washington, Md.

MAJOR

Patch, A. M.

CAPTAINS

Conway, M. J.
Halsey, M. B.
Louisell, W. D.
Negrotto, S. H.
Pearson, F. J.

1ST LIEUTENANTS

Allan, C. V.
Armstrong, J. D.
Bush, J. K.
Christian, W. W.
Newman, O. P.

2D LIEUTENANTS

Hammond, T. W.
King, C. B.
Lynch, F. H.
McNair, D. C.
Meloy, G. S.
Morin, M. J.
Taylor, J. S.

13th Infantry
Ft. Adams, R. I.

COLONEL

Chamberlain, F. V. S.

LT. COLONEL

Scott, J.

CAPTAINS

Thorn, H.
Johnson, A. D.
Tribolet, H. A.
Davis, G. F.
Harvey, L. I.
Lussier, R. F.
Wheeler, W. K.

1ST LIEUTENANTS

Dooley, J. E.
Shum, R. E.
Wennerberg, F.
Farley, J. F.
Tully, T. J.
Kinney, G. C.

2D LIEUTENANTS

Damas, W. N.
Jeter, J. R.
Mackintosh, H., Jr.
Cruise, E. E.
Johnson, R. C.

Absent:

Gilchrist, J. R.

Ft. Ethan Allen, Vt.

LT. COLONEL

Beebe, R. E.

CAPTAINS

Bechtold, J. E.
Ellis, R. B.
Ryder, I. E.
Bolan, H. W.

1ST LIEUTENANTS

Cowles, E. R.
Nelson, K. J.
Hubbell, R. W.

2D LIEUTENANTS

Lawrence, G. H.
Thayer, A.

14th Infantry
Ft. Davis, C. Z.

COLONEL
Gohn, J. F.

LT. COLONEL
Woolnough, J. B.

MAJORS
Whiting, G. W. C.
Stevens, J. A.
Bertram, E. H.
Paschal, P. C.

CAPTAINS
Bell, L.
Elson, J. H.
Willis, R. W.
Gent, W. F.
Nielsen, G. C.
Wright, A. T.
Craig, M. E.
Renth, E. J.
Stewart, J. M.
Johnson, E. H.
Kennon, B. C.
Huber, L.
Lawrence, J. H.
Cunningham, W. A.
Orrill, A.
Waite, W. A.
Lewis, H. L.

1ST LIEUTENANTS
Rubinstein, D. H.
Beine, H. E.
Davis, C. T.
Carlsten, C. H.
Hazeltine, C. R.
Granberry, H. C.
Douthit, S. L.
Ballard, D.

2D LIEUTENANTS
Lightcap, G. E.
Saffarrans, W. C.
Van Brunt, R.
Cleaves, H. H.
Halverson, J.
Colson, J. B.
Wade, J. O.
Rudolph, F. A.
Martin, G. E.
Quinn, H. A.
Axup, R. W.

Absent:
Regan, J., Jr.

15th Infantry
Tientsin, China

COLONEL
Taylor, J. D.

LT. COLONEL
Cummins, J. M.

MAJORS
Jones, W. R., Jr.
Doe, J. A.

CAPTAINS
Daniels, L. F.
Whitcomb, J. C.
Egger, G. B.
McCroskie, F. C.
Hostetler, R. L.
Davis, G. A.
Ramsey, G. L.
Kennedy, A. J.
Foy, L. W.
Collier, W. A.
Champeny, A. S.
Colby, E.
Harvey, J. B.
Thompson, O. H.
Nichols, J. A.
Keith, H. W.

1ST LIEUTENANTS
Pence, C. W.
Sanders, R. C.
Peach, E. W.
Smith, C. A.
Jenkins, R. E.
Shepard, W. P.
McClure, R. B.
Christian, T. H.
Howard, T. T.
Adams, S. J.
Honnen, G.
Warden, C. C. B.
Dwyer, P. R.
Emanuel, E. H.
Boatner, H. L.

2D LIEUTENANTS
Koch, R. A.
Cornog, W. W., Jr.
Lamb, S. S.
Ford, H. P.
Glasgow, W. J., Jr.

16th Infantry
Ft. Jay, N. Y.

COLONEL
Williams, A. S.

LT. COLONEL
Phillipson, I. J.

MAJORS
Lemmon, F. L.
Schwein, E. E.
Bond, T. G.

CAPTAINS
Pickett, J.
Brown, P. D.
Savage, G. P.
McCarthy, L. J.
Ritter, W. L.
Jones, D.
Andrews, J. A.
Bashore, W. E.
Nealon, J. J.
Cooper, C. F. F.
Burns, F. L.
Hoffman, R. J.
Madigan, F. T.

1ST LIEUTENANTS
Welcker, C. A.
Smith, V. W.
Hardy, W. J.
Harris, J. T.
Warren, J. H.
Frederick, J. D.
Moroney, W. J.
Hoke, W. M.

Absent:
Bruckner, J. A.

2D LIEUTENANTS
Reynolds, J. M.
Kirby, H. C.
Lovell, J. M.
Callery, J. R.
Nichols, J. A.
Buchanan, D. H.

Absent:
Campbell, D.
Haskell, F. W.
Bork, L. S.

Ft. Wadsworth, N.Y.

MAJOR
MacDonald, S. C.

CAPTAINS
Ednie, A. V.
Metcalfe, S. L.
Andino, E.

1ST LIEUTENANTS
Bond, E. J.
Rosenbaum, F. B.
Frederick, J. D.

2D LIEUTENANTS
Ginder, P. D.
Beall, H. L.
Moran, H. F.
Jones, S. W.
Totten, J. E.

17th Infantry
Ft. Crook, Neb.

COLONEL
Trott, C. A.

MAJORS
Vachon, J. P.
Koenig, E. F.

CAPTAINS
Wood, S. A.
Austin, H. A.
Boatwright, J. R.
Lammons, F. B.
Wickham, F. O.
Chase, A. G.
Griswold, S. F.
Hurless, B. F.
Cherry, T. G.
Ferguson, J. M.
Sebastian, H. G.
Gist, J. H.

1ST LIEUTENANTS
Dupree, H.
Hughes, O. W.
Gunn, D. M.
Robinson, W. A.
Fisher, H. G.
MacKenzie, A. J.

2D LIEUTENANTS
Dudley, G. W. M.
Lane, S. H.
Williams, J. O.
Maulsby, W. E., Jr.
Caldwell, W. G.
Graham, L. B.

Ft. Omaha, Nebr.

LT. COLONEL
Dunford, R. A.

CAPTAINS
Sebastian, H. G.
Wickham, F. O.
Kaech, E. A.

1ST LIEUTENANTS
Simmonds, C. D.
Grimes, A. J.

2D LIEUTENANTS
Bailey, H. M.
Helson, R. T.
Lindsey, J. B.

18th Infantry
Ft. Hamilton, N.Y.

COLONEL
Graham, W. B.

LT. COLONEL
Thuis, C. A.

MAJORS
Cheadle, H. B.
Gardner, A. G.
Dowling, P. J.

CAPTAINS
Scott, D. M.
Goodyear, M. B.
Beers, W. H.
Wise, K. B.
Flanigan, W. A.
Hackney, E. N.
Harris, T. A.
Culton, A. Y.
Hodge, J. R.

Absent:
Blue, J. W.

1ST LIEUTENANTS
Marsh, J. H.
Brenner, J.

Absent:
Emory, H. R.
McCarthy, J. E.
Mitchell, R. T.

2D LIEUTENANTS
Blair, R. C.
Scott, J. D.
Barkes, L. C.
Dombrowsky, A. J.
Kellotat, W. F.
Griffin, T. N.
Silver, S. F.
Quinn, D. W., III.
Schepps, M. C.
Hanson, H. F.

Ft. Schuyler, N. Y.

MAJOR
Ayer, W. F.

CAPTAINS
Lewis, H. H.
Rouse, R. T.
Brooks, H. J.

1ST LIEUTENANT
Tanzola, V. J.

Absent:
McGehee, A. J.

2D LIEUTENANT
McAneny, G. F.

Ft. Slocum, N. Y.

MAJOR
Lockwood, B. C., Jr.

CAPTAINS
Coghlan, J. J.
Parker, H. C.

1ST LIEUTENANTS
Roysdon, D. S.
Smith, C. E.
Dickey, F. R.

2D LIEUTENANTS
Nadal, R. A.
Webb, A. N.
Seitz, J. F. R.

19th Infantry
Schofield Bks., T. H.

COLONEL
De Funiak, F. B. Jr.

LT. COLONEL
Pruyn, J. M.

MAJORS
Evans, A. C.
Culberson, W. L.
James, H. W.

Absent:
Poland, E. L.

CAPTAINS
Doyle, T. W.
Kennedy, S. Y.
Fergason, S. C.
Powell, A. J.
Orr, R.
Gibson, J. H.
Parkhurst, G. C.
Griffin, J. A.
Pedley, A. A., Jr.
Porter, R. E.
Malone, E. H.
Johnson, W. H.
Knight, P. R.
Heath, H. K.
Heap, T. P.
Vevia, P. J.
Fields, E. L.

Absent:
Irving, F. A.

1ST LIEUTENANTS
Lukert, E. P.
Jespersen, H. C.
Miner, E. M.
Homewood, J. W.
Clark, F. J.
Baughman, R. L.
Stephens, R. W.
Regnier, A. J.

Absent:
Wiltamuth, R.

2D LIEUTENANTS
Burgess, H. C.
Elward, N. K.
Rutte, L. B.
Bigelow, W. H.
Smyth, T. E.
Dietz, G. H.
Hickman, G. W., Jr.
Silverman, R.
Barbour, T. E. P.
Douglas, W. T.
Burns, J. R.
Kaylor, J. P.
Whatley, V. D., Jr.

Absent:
Maglin, W. H.

20th Infantry
Ft. Francis E. Warren, Wyo.

COLONEL
Neff, J. H.

LT. COLONEL
Absent:
Gregg, L. L.

MAJOR
Bonney, F. E.

CAPTAINS
McKee, E. L., Jr.
Franson, P. O.
Jenkins, T. G.
Ide, H. R.
Coulter, W. L.
Adair, A.
McKenna, J. W.
Crockett, G. K.
Boyle, E. E.
Dinsmore, H. D.
Hale, W. A.
Montesinos, M.
Irvine, W. H.

1ST LIEUTENANTS
Robinson, D. L.
Bizzell, L. C.
Winstead, T. E.
Williams, C. L.
Greene, J. F.
Farmer, C. R.
Essig, T. W.
Ziegler, A. N.
Olson, K. S.
McLean, D. S.
Jones, W. C.
Haney, L. W.
Foster, R. M.
Cragun, D. J.

2D LIEUTENANTS
Ross, J.
Watkins, G. M.
Kutz, C. R.
Fadness, A. G.

21st Infantry
Schofield Bks., T. H.

COLONEL
Arrowsmith, G. D.

LT. COLONEL
Charlton, G. C.

MAJORS
Cowles, D. H.
Reed, M.
Switzer, J. S., Jr.
McClure, W. R.

CAPTAINS
Bulger, J. W.
Daugherity, R. D.
Tiffany, S. R.
LeGette, A. S.
Graham, G. C.
Gaskins, C. E.
Robinson, P. B.
Craig, C. F.
O'Daniel, J. W.
Hull, J. E.
Scudder, I. C.
Bain, B. B.
Barnhill, L. H.
Fenters, C. E.
Skinner, G. W.
Hardee, F. W.
Kelly, C.
Nolan, J. P.
Smith, R. P.
Fox, W. J.
Williams, S. T.
Chamberlain, C. M., Jr.

1ST LIEUTENANTS
Hoy, T. A.
Davies, T. H.
Jacobs, R. C., Jr.
Knudson, F. L., Jr.
Lawson, R. M.
Thorpe, E. R.
Kelley, E. W.
Bidwell, B. W.
Arnold, W. H.

2D LIEUTENANTS
Millener, G. A.
Phasey, V. E.
Crombez, M. G.
Renfro, C. D.
McComas, L. Q.
Gose, E. B.
Causey, L. G.
Jones, L., Jr.
McNerney, C. D.
Smith, G. A., Jr.
Gans, E. A.
Lodoen, G. O. N.
Wheaton, H. J.

22d Infantry
Ft. McPherson, Ga.

COLONEL
Caffey, L. W.

LT. COLONEL
Cheston, D. M.

MAJOR
Seals, C. L.

CAPTAINS
Child, F. M.
Rooks, L. W.
Higgins, E. A.
Pinckney, G.
Wheeler, D. E.
Wing, A. G.
Teate, H. F.
Chandler, C. C.
Donahue, J. H.
Ramsey, T. H.

Absent:
Cornell, T. M.
Addington, F. T.

1ST LIEUTENANTS
Lifsey, C. Q.
Monger, A. J.
Sharp, W. B.
Moore, R. S.
Morgan, A. C.

2D LIEUTENANTS
Mack, E. C.
Turner, R. G.
Cook, R. L.

Absent:
Hunter, R. E.

Ft. Oglethorpe, Ga.

MAJOR
Thomas, C. W., Jr.

CAPTAINS
Jones, R. A.
Brown, T. C.
Howe, J. H.

1ST LIEUTENANTS
Joyce, T. F.
Hudson, C. F.

2D LIEUTENANTS
Mason, S. B.
Giddings, F.

Ft. McClellan, Ala.

MAJOR
Baer, M. R.

23d Infantry

Ft. Sam Houston, Tex.

COLONEL
Parker, A. A.

LT. COLONELS
Mitchell, C. L.

Attached:
Connolly, W. J.
Lopez, P.

MAJORS
Boyd, J. W.
Allen, J. W. F.

Attached:
Wheeler, L. M.
Harer, L. G.

CAPTAINS
Hufford, G. D.
Hilton, R. C.
Groff, N. P.
Pendergrast, G. H.
Coulter, H. K.
Forsythe, J. D.
Mulkey, O. A.
Dibrell, J. T.
Patterson, R. W.
Swift, W. A.
Andersen, C. C.
Mays, W. L.
Triplett, A.
Lynch, J.
Knight, B. L.
Shelton, H.
Wieners, F. B.

1ST LIEUTENANTS
Hester, L. M.
Heffner, P. T.
Marsh, W. A.
Kindall, S. G.
Perry, H. R., Jr.
Beall, B.
Graham, L. S.
Holland, T. G.

2D LIEUTENANTS
Finch, R.
Hamilton, P.
Horton, T. R.
Kinsler, K. H.
Smyly, J. W., Jr.
Flood, H. L.
Butchers, R. J.
Vittrup, R. L.
Nave, W. L.
Fitzgibbons, J. J.
Stevenson, W. F.

24th Infantry
Ft. Benning, Ga.

COLONEL
Galleher, P. C.

LT. COLONEL
Tarbutton, E. H.

MAJORS
Coates, C. E.
Schmidt, W. R.
Ritchel, C. S.
Dollarhide, E. S.
Steel, C. L.

CAPTAINS
Horan, J. P.
Tupper, J. L.
Saulnier, S. G.
Seamon, W. E.
Wood, J. I.
Schmidt, F. O.
Lyons, J. P.
Paynter, E. F.
Brian, A. R.
Sherman, R. G.
Helsley, A. B.
Murphy, W. G.
Curtis, I. S.
McCoy, F. L.
Buracker, S. L.
Chapman, W. M.
Curren, E. J. Jr.

1ST LIEUTENANTS
Sander, A. R. C.
Kelley, H. S.
Earle, E. P.
Merritt, H. L.
McKnight, R. D.
Ellison, H. B.
Mood, O. C.
Applegate, E. C.
Lewis, W. S.
Greene, J. I.
Forse, W. B.
Alderman, C.
Mattice, E.

2D LIEUTENANT
Isaacs, G. E.

25th Infantry
Nogales, Ariz.

COLONEL
Shipp, A. M.

LT. COLONEL
Parker, H. A.

MAJOR
Halloran, G. M.

CAPTAINS
Lynd, R. F.
Howard, J. C.
Phillips, W. L.
MacNab, A. J.
Jones, M. E.
Oppermann, I. A.
Fisher, H. H.
Powell, R. E.

Absent:
Besse, L. R.

1ST LIEUTENANTS
McKee, W. H.
Smith, L. R.
Proctor, G.
Coates, H. L.
Hardin, D. C.
Shaw, J. C.
Frissell, D. P.
Ballou, C. N. S.
White, H. V.

2D LIEUTENANT
McGarr, L. C.

Camp Harry J. Jones, Ariz.

MAJOR
Armstrong, F. M.

CAPTAINS
Connett, L. L.
Arnold, J. W.
Waltz, W. P.
McMillin, D. N.
Norris, F. H.
Chamness, H. S.

1ST LIEUTENANTS
McDonald, T. J.
Pahlke, J. F.
Schas, W. D.

2D LIEUTENANTS
Houseman, E. M.
Kelly, R. H.
Statham, H. R.
Gavin, J. M.

Ft. Huachuca, Ariz.

MAJOR
Fowler, G. R.

CAPTAINS
McCutcheon, W. H., Jr.
Wilson, F. H.
Campbell, T. E.
Floyd, A.
Stevens, O. G.
Smith, C.

1ST LIEUTENANTS
Undritz, F. R.
Lichtenwalter, L. E.
Ridings, E. W.
Kirkpatrick, L. S.

2D LIEUTENANTS
Shimonek, W. H.
Parient, W. R.

26th Infantry
Plattsburg Bks., New York

COLONEL
Madden, J. F.

LT. COLONEL
Hay, D. D.

MAJORS
McDonald, D. F.
Sullivan, M. W.
Taylor, R. T.

CAPTAINS
Kearney, H. C.
Hopkins, J. N.
MacMullin, G. M.
Miller, C. R.
Keatley, E. E.
McClune, H. H.
Bresnahan, T. F.
Morrow, G. L.
Fay, E. N.
Horan, E. C.
Von Gremp, W. W.
Phinney, A. E.
Budd, O. W., Jr.
Carle, C. D.
Lyons, C. M.
Lynch, C. P.
Nichols, L. W.
Field, L. E.

1ST LIEUTENANTS
Brady, J. E.
Harris, F. M.
Ashton, D. M.
Fry, J. C.
Gilmartin, A. F.
Carter, M. H.
Woodruff, C. E.
Storck, L. J.

2D LIEUTENANTS
Kiel, H. I.
Uhrbrock, H. W.
Strange, W. S.
Lansing, S. M.
Moseley, G. V.
Calyer, P. D.
Boland, J. P.
Wills, G. F.
Simon, W. A.

27th Infantry
Schofield Bks., T. H.

COLONEL
Hunt, W. E.

LT. COLONEL
Herman, R. J.

MAJORS
Brown, A. E.
Adler, C. J.
Hitchcock, A. B.
Brannan, F. M.

CAPTAINS
Hedge, G. R.
Stark, J. V.
Mullins, W. F.
Cleaver, G. C.
Merrill, H. N.
Hunt, G. A.
Hinwood, J. H.
Ennis, R. B.
Westfall, C. C.
Groves, J. M.
Wimberly, N. A.
Church, J.
Lowery, W. B.
Bates, E.
Simpson, F. P.
Holmes, T. R.
Burt, F.
Waterbury, P. B.

1ST LIEUTENANTS
Murphy, L.
Miller, J. S.
Brier, W. W., Jr.
Hastings, D. L.
Fowler, D. M.
Keeley, H. J.

2D LIEUTENANTS
Criswell, H. D.
Bartz, R. F.
Kengla, L. F., Jr.
Robinson, N. J.
Smith, C. H.
Anderson, J. R.
Nourse, R. S.
Carroll, P. L.
Dougherty, J. R.
Grace, W. P., Jr.
Hawkins, J. D.
Watts, N. E.
Loviess, J. B.
Butler, L.

Absent:
Hutton, P. C., Jr.

28th Infantry
Ft. Niagara, N. Y.

COLONEL
Stewart, G. E.

LT. COLONEL
Fulmer, J. J.

MAJOR
Mills, B. W.

CAPTAINS
Brown, P. H.
Hasson, J. A.
MacGregor, L. E.
Garza, J. L.
Nelsen, N. M.
Poindexter, W. O.
Swab, R. E.
Richmond, V. L.

1ST LIEUTENANTS
Schriver, A. J., Jr.
Cole, J. V.
Fairbrother, H. W.

2D LIEUTENANTS
Cooper, P.
Elliott, G. E.
Peploe, G. B.
Ewing, C. B.
Maerdian, F. R.
Delmonico, L. R.
Lockett, J. W.
Vincent, R. F.
Andrews, R. W.

Madison Bks., N. Y.

MAJOR
Carlock, F. D.

CAPTAINS
Goding, E. C.
Hackett, W. K.
Wilbur, H. S.

1ST LIEUTENANTS
Stebbins, A. K., Jr.
Sibley, C. C.

2D LIEUTENANTS
Miller, V. R.
Verbeck, W. J.
Johnson, W. P.
McNamara, A. T.

Ft. Ontario, N. Y.

MAJOR
Sloan, F. A.

CAPTAINS
Bachus, J. L.
Addington, J. C.
Yancey, W. B.

1ST LIEUTENANTS
Kullman, J. W.
Kielty, J. A.

2D LIEUTENANTS
Phelan, W. J.
Fuller, L. A.
Bock, F. L.

29th Infantry
Ft. Benning, Ga.

COLONEL
Pendleton, H., Jr.

LT. COLONELS
Strayer, T.
Brandt, A.
Hunt, E.

MAJORS
Phelps, F. C.
Middleton, T. H.
Taylor, T. F.

CAPTAINS
Rhoads, O. R.
McAllister, M. D.
Beavers, H. B.
Reed, O. W.
Wear, G. S.
Halloran, M. E.
Joiner, T. D.
Lovett, R. B.
Ulsaker, C. M.
Huskea, V. G.
Richmond, N. W.
Woodward, N. D.
Deane, J. R.
Bassett, R. O., Jr.
Lavin, R. P.
Barker, E. S.
Brine, E. L.
Finney, M. R.
Beatty, G. S.
Atkinson, E. C.

1ST LIEUTENANTS
Stark, T. N.
Vinson, W. H.
Kovarik, J. C.
Cochran, W. B.
Curtis, M. S.
Wharton, S. F.
Drewry, F. A.
Knight, L. B.
Brandhorst, H. W.
Jacobs, B. R.
Killpack, H. W.
Donegan, W. E.
Carney, J. J.
Pulliam, H. E.
Privett, F. H.
Pearson, F.
Brimmer, H. W.
Skelton, W. G.
Adams, D. L.
Jackson, C. E.
Walsh, E. J.
Diller, L. A.
Vernon, E. H.
Coates, C. H.

Absent:
Stokes, J. H.

2D LIEUTENANTS
Daugherty, J. B.
Kammerer, M. R.
Brown, R. H.
Gilbreth, J. H.
Hocker, W. F.
Strickler, D. G.
Hedekin, D. D.
Selman, G.
Wells, T. J.
Breckinridge, W. M.
Wiley, N. J., Jr.
Doidge, J. P.
Moran, T. J.
Cralle, M. S.
Parham, A. H.
Trent, J. F.
Adams, P. D.
Bell, W. L., Jr.
Bullock, W. C.
Krauthoff, L. W.
Grier, J. L.
Sladen, F. W., Jr.
Woods, R. N.
Hubard, R. B.
Winn, J. J.
Joyes, J. W.
Lynch, G. E.

30th Infantry
Pres. of San Francisco, Calif.

COLONEL
Brown, F. R.

LT. COLONEL
Thompson, C. F.

MAJORS
Jenkins, J. L.
Ord, J. G.
Smith, G. L.
Smith, R. C.

CAPTAINS
Slappey, E. N.
MacKechnie, A. R.
Mann, W. M.
Kraul, G. E.
Bergin, W. E.
Lloyd, P. J.
Fountain, J. R.
Poland, T. G.
Minnigerode, K.
Newton, J. C.
Forbes, M. H.
Thebaud, J. V.
Muller, W. G.
Roady, J. O.
McCarthy, T. F.

Absent:
Cauthorn, F. S. B.

1ST LIEUTENANTS
Wilson, H. M., Jr.
McChrystal, H. J.
Riley, D.
Ancrum, J. N.
Smith, W. E., Jr.
Prizer, O. H.
Phipps, G. L.
Mickelwait, C. B.
French, W. J.
Newberry, J. W.
Cain, L. B.
Kindley, R. B.
Bruner, G. E.
Haynes, A. F.
Hess, J. B.
Sydenham, H. G.
Taylor, G. A.
Mergens, G. C.

2D LIEUTENANTS
Reeder, R. P., Jr.
Currie, W. R.
Montgomery, H. G., Jr.
Strauss, R. V.
Hammack, L. A.
Mathews, J. J.
Geary, J. A.
Love, R. L.

31st Infantry
Post of Manilla, Rizal, P. I.

COLONEL
Kimbrough, J. M.

LT. COLONEL
Hooper, E. L.

MAJORS
Henley, D.
Carr, W. W.
Engleman, I. H.

CAPTAINS
Haywood, J. E.
Collins, F. E.
Knuebel, J. H.
Harries, H. L.
Mitchell, W. L.
Slate, R.
Lloyd, C. L.
O'Donoghue, W. F.
Johnston, R. H.
Rich, F. M.
Riner, D. H.
Still, K. M.
Stack, R. I.
Lippincott, J. R.
Adams, F. W.
Cowen, G. G.
Tydings, W. L.
Sells, B. J.
Colpin, E. R.
Crowley, E. K.
Sullivan, C. J.
Burnap, A. E.
May, W.
Watkins, R. B.
Roberts, W. H.
Turrentine, R. F.

1ST LIEUTENANTS
White, A. F.
McCoy, E. D.
Ross, D. M. N.
Deaderick, G. S.
Stetler, W. A.
Irwin, J. W.
Hardee, D. L.
Connor, G. R.
Nimocks, D. R.
Henry, H. P.
Schaefer, W. H.
Ives, W. M.

2D LIEUTENANTS
Baker, R. A.
Graves, R. D.
Ramsey, J. W., Jr.
Brinson, N. M.
Latimer, F. N.
Newman, A. S.
Riggins, L. A.
Dansby, J. W.
Long, W. E.
Barnett, J. D.
Cleland, J. P.
Stephenson, W. G.
Thurston, B. E.
Laidlaw, W. E.
Bowen, F. S., Jr.
Skinner, M. L.
Dabney, J. A.
McCleave, R. B.

33d Infantry
Ft. Clayton, C. Z.

COLONEL
Kellond, F. G.

LT. COLONEL
Severson, C. F.

MAJORS
Davidson, J. H.
Hathaway, P.
Van Vliet, R. C., Jr.
Bishop, R. H.

CAPTAINS
Voege, R. W.
Whitney, J. W.
Farnsworth, J. F.
Chalker, C. W.
Wood, W. S.
Klein, J. A.
Clark, H., 2d
Seifer, C. W.
Eggers, L. W.
Moore, F. M.
MacLaughlin, S. S.
Niederprum, W. J.
Shoe, R. O.
Shipp, B. A.
Nichols, A. J.
Fariss, W. B.
Cassedy, H. I.

1ST LIEUTENANTS
Lee, C. B.
Lawrence, F. J.
Marshall, W. F., Jr.
McMillan, J. M.
Calais, C. H.
Dietz, L. A.
Epps, G. D.
Anderson, C. F.
Lanham, C. T.

2D LIEUTENANTS
Stevens, F. R.
Hill, J. G.
Traywick, J. T.
Martin, R. R.
Tibbetts, R. E.
Peterson, A. S.
Herte, R. J.
Johnson, H. W.
Walker, J. E.
Johnson, H. R.
McGown, D. P.

Daughtry, B. A.
Stanton, R. G.
Moore, W. T.
Griffith, J. H.

34th Infantry
Ft. Eustis, Va.

COLONEL
Smith, A. T.

LT. COLONELS
Morrison, C. R. W.
Mason, C. W.

MAJORS
Jones, W. G.
Stephens, J. W. G.
Kerr, D. R.

CAPTAINS
Elliott, C. N.
Funk, A. J.
Cianchini, L. F.
Jones, C. R.
Martin, C. A.
Finley, D. H.
Murphy, J. L.
Johnston, H.
Morgan, C. C.
Lundy, C. A.
Moncure, W. A. P.
Tow, W. M.

1ST LIEUTENANTS
Van Studdiford, G.
Sutton, S. T.
Faine, S. E.
Davis, G. M.
Haskell, L. W.
Schaffer, W. H.
Howell, G. P.
Brady, L. E.
Norman, D. P.
Conley, S. G.

2D LIEUTENANTS
Stika, R. W.
Baird, W. J.
Howard, F. E.
Webb, E. M., Jr.
Morton, P.
Poorman, D. A.
Arnett, C. T.
Herndon, C. B.
Chard, R. H.

35th Infantry
Schofield Bks., T. H.

COLONEL
Welborn, I. C.

LT. COLONEL
Potter, P. C.

MAJORS
Keen, H. B.
McLean, F. R.
McLain, R. E.

CAPTAINS
Cartwright, L. J.
John, E.
Brown, E. E.
Condren, G. D.
Malone, E. H.
Boyer, E. J.
Walk, A. R.
Rehm, W. F.
Weaver, L.
Ward, F.
Lloyd, J. P.
Lagorie, A. P.
Linnell, F. E.
Johnson, E. A.
Ross, F. D., Jr.
Starrett, C. H.
Thom, K. W.

1ST LIEUTENANTS
Boettcher, H. J.
Hart, C. H., Jr.
Baker, J. J.
Jordan, H. S.
Hadsell, G. A.
Ackerman, S. W.

2D LIEUTENANTS
Malin, H. A.
Bailey, C. N.
Lloyd, W. W.
Thomas, R. G., Jr.
Decker, G. H.
Mitchell, D. E.
Westlund, C. W.
O'Connor, W. W.
Sloane, C. C., Jr.
Peck, M. W.
Kane, J. H.
Black, P. J.
Munson, E. L., Jr.
James, T. H.
Shugart, C. Z.
Powell, H. B.
Stark, E. D.

38th Infantry
Ft. Douglas, Utah

COLONEL
Price, H. C.

MAJORS
Hodges, C. H.
Mueller, P.

CAPTAINS
Caygill, H. W.
Conway, T. T.
Karstad, C. H.
Mitchell, E. H.
Morris, A. L.
Pierce, G. S.
Robinson, C. A.
Rogers, F. B.
Schwatel, W. P.
Sherwood, W. I.
Sloan, R.
Wolbar, O. K.

1ST LIEUTENANTS
Bassett, R. H.
Boone, J. W.
Brawner, P. A., Jr.
Dean, W. F.
Greene, H. F.
Krams, C. K.
Mueller, W. J.
Opie, R. E. G.
Wells, O. D.
Wilkes, B. B., Jr.

2D LIEUTENANTS
Barlow, E. A.
Easley, B., Jr.
Grinstead, J. B.
Kearney, C. F.
Knudsen, J. S.
Lynch, G. P.
Palmer, H.
Stewart, J. A.

Ft. Sill, Okla.

MAJOR
Weld, S. L.

CAPTAINS
Gough, J. E.
Lathrop, L. T.
Barndollar, M. D.
Gorder, A. O.
Plank, C. H.

1ST LIEUTENANTS
Rycroft, J. E.
Fitts, W. T., Jr.
Floyd, R. B.

2D LIEUTENANTS
Moses, M.
Smith, R. L.
Beaver, G. M.
Walker, D. E.

45th Infantry
Ft. Wm. McKinley,
Philippine Islands

COLONEL
Martin, C. A.

LT. COLONEL
Hoffman, C. S.

MAJORS
Alden, C. T.*
Miller, E. B.
Shearer, S. E.*
Collins, T. K.*
Skladal, C.*
Lim, V.*
Monroe, T. H.

Absent:
Lantz, C. H.*

CAPTAINS
Hillsman, R.
Kelly, J. J.
Dark, R. F.
Summers, O.
Capinpin, M. M.*
Wessels, T. F.
Dexter, H. V.
Read, G., Jr.
Baker, P. T.
Gilbert, H. N.
MacDonald, G. F.
Carter, W. M.
Barth, R. A.*
McGuire, M. J.
Adkins, E. C.
Hyssong, C. L.
Wells, E.*
Scheibla, H. D.
Passailaigue, E. P.

1ST LIEUTENANTS
Christian, F.*
Haltiwanger, W. N.*
Hollister, P. A.*
Haynes, H. M.*
Bryant, R. W.
Smith, W. B.
Jaynes, L. C.
Compton, I.
Walecka, J. L.*
Edmands, H. J.*
Kelly, J. E.
Evans, J. K.
Prather, R. G.

2D LIEUTENANTS
Strother, K. C.
Bragan, O. P.
Mead, A. D., Jr.
Hundley, D. H.
Matthews, H. F.
Wilson, O. O.
Cole, W. A.
Clinton, J. W.
Gaddis, J. W.
Pheris, W. E., Jr.
Ashburn, T. Q., Jr.
Horner, A. A.
Dunn, T. L.
Geraghty, M. J.
Suttles, E. A.
Evans, J. M.
Van Syckle, D. L.
Van Horne, E. J.
O'Brien, J. D.

57th Infantry
Ft. Wm. McKinley,
Philippine Islands

COLONEL
Myer, E. A.

LT. COLONEL
Hossfeld, H.

MAJORS
Gillmore, R. A.*
Parfit, E.*
Mortenson, G. J.*
Ladd, O. M.*
Moore, R. B.

Absent:
Hunt, E. L.*

CAPTAINS
Hildebrand, H. B.
Burgess, T. B.
Chastaine, B. H.
Barnett, A. J.
Ostrander, J. L.
Hutson, L. D. L.
Towle, W. H.*
Fry, P. T.
Brand, T. S.
Donovan, L.
Roderick, T. E.
Hildring, J. H.
Fielder, K. J.
Hagerty, R. N.
Marsh, C. L.
Moore, J. S.
Hartman, G. L.
Wolfe, L. R.
Smith, H. T.

1ST LIEUTENANTS
Mamer, J.*
Bigby, W. A.
McRae, P. M.
Hall, B. M.
Howard, H. W.*
Thoroughman, R. M.
Graham, J. E.
Dunkelberg, W. E.
Guevara, S. G.*
McCormick, O.
Poblete, R.*

2D LIEUTENANTS
Hames, S. T.
Keiler, R. D.
Carne, W. J.
Honnold, W. H.
Ordway, G., Jr.
Evans, I. K.
Lynch, G. P.
Bataga, E. M.*
Dunn, F. E.
Brunks, W. H.
Whittle, C. L.

(*) Philippine Scouts.

65th Infantry
Post of San Juan,
P. R.

COLONEL
Helms, G. W.

LT. COLONEL
Upham, J. S.

MAJORS
Mercader, L.
Birmingham, R. C.
Gillfillan, J. E.
Townsend, J. D.
Jones, C. W.

CAPTAINS
Pendleton, A.
Joerg, R., Jr.
Dodd, P. J.
Spicer, C. B.
Wappenstein, W. A.
Edgerton, F. V.
Frye, R. E.
Ringe, J. H.
Way, C. C.
Pigman, M. K.
Pettee, C. S.
Thompson, S. C.
Goe, W. E.
Ring, R. L.
Hill, J. F.
Homes, D. N.
Arnold, E. G.
Jackson, W. A.
Creamer, J. K.
Boulware, M. B.

1ST LIEUTENANTS
Sherfey, L. W.
Mullett, D. T.
Wilders, P. C.
Willis, H. E.
Gray, W. V.

2D LIEUTENANTS
Noble, M. C.
Kearns, E. B., Jr.
Crandall, H. W.
Vail, H. K.
Sugrue, C. D.
Feather, E. H.
Luongo, H. L.
McLaughlin, E. D.
Schewe, P. E.
Johnson, W. M.
Dickerson, A. H.
Segarra, A.
Hornisher, F. A.
Bell, R. E.
Sink, R. F.
Bender, G. E.
Bauer, M. F.
Dark, J. L.

1st Tank Regiment
Ft. George G. Meade,
Md.

LT. COLONEL
Delaplane, C. E.

MAJOR
Dailey, G. F. N.

CAPTAINS
Culp, C. M.
Raymond, S. J.
Ryan, C. J.
Harding, F. C.
Johnson, J. N., Jr.
St. James, R. G.
Bissett, D. A.
Anderson, G. H.
Whatley, R. J.
Smith, E. F.

Absent:
Tharp, L. D.

1ST LIEUTENANTS
Chrisman, T. J.
Day, L. A.
Heylmun, E. B.
Lenow, C. B.
Caperton, R. J.

Bonwell, M. W.
Paquet, L. C.
Barnes, G. D.
Round, R. E.
Shattuck, M. C.
Robinson, C.

Absent:
Elkins, S. B.

1st Tank Regiment (2d Battalion) Ft. Benning, Ga.

MAJOR
Brett, S. E.

CAPTAINS
Taylor, J. E.
Chester, M. S.
Howland, W. A.
Althaus, K. G.
Lampke, L. J.
MacDonald, R.

1ST LIEUTENANTS
Gutkowski, J. J.
McLamore, R. T.
Smith, W. A.
Reed, H. E.
Childs, B.
Pierson, A.
Watkins, E.
Vida, F. J.
Roberts, W. T. S.
Leone, L. P.
Barr, D. G.

2D LIEUTENANTS
O'Neill, G. P.
Macklin, J. E.
Smith, W. C.
March, K. F.
Roosma, J. A.
Cobb, A. L.

2d Tank Regiment (2d Battalion) Ft. George G. Meade, Md.

CAPTAINS
Hoyt, H. B.
Griswold, H. C.
Remington, W. E.

1ST LIEUTENANTS
Murphey, J. A.
Johnson, E. C.
Mueller, E. A.
Ramsey, A. C.

2D LIEUTENANT
Meister, M. E.

1st Tank Company Miller Field, L. I.

CAPTAIN
O'Mohundro, W. H.

1ST LIEUTENANTS
Buechner, W. H.
Erdman, R. K.

2D LIEUTENANT
Glavin, E. J. F.

2d Tank Company Ft. Sam Houston, Tex.

CAPTAINS
Brockschink, F. R.
Dittemore, H. P.

1ST LIEUTENANTS
Brown, H. V.
DeWitt, E. A.
McCaskey, D. D.

2D LIEUTENANT
Scott, E. L.

3d Tank Company Ft. Lewis, Wash.

CAPTAIN
Spalding, D. P.

1ST LIEUTENANTS
Alexander, R. E.
Collins, W. O.
Long, W. D.

4th Tank Company (1st Platoon) Ft. McClellan, Ala.

CAPTAIN
McCafferty, G. H.

1ST LIEUTENANT
Shingle, E.

4th Tank Company (2d Platoon) Ft. George G. Meade, Md.

1ST LIEUTENANT
Wheeler, R. B.

5th Tank Company (1st Platoon) Ft. Ben. Harrison, Ind.

1ST LIEUTENANTS
Morgan, H. T.
Roane, T. W.

5th Tank Company (2d Platoon) Ft. Rodman, Mass.

CAPTAIN
Murphy, D. P.

1ST LIEUTENANT
Jordan, L. P.

6th Tank Company, (1st Platoon) Jefferson Bks., Mo.

1ST LIEUTENANTS
Larkins, R. H.
Moore, A. L.

6th Tank Company (2d Platoon) Ft. Snelling, Minn.

1ST LIEUTENANT
McAllister, E. J.

11th Tank Company Schofield Bks., T. H.

CAPTAIN
Cutler, O. M.

1ST LIEUTENANTS
Carman, J. L.
Ricamore, P. W.
Dayton, J.

2D LIEUTENANT
Seely, T. A.

Reviews and Discussion

Military Procedure

Prepared expressly for the citizen soldier.

MAJ. GEN. E. G. PEYTON, U. S. Army

TRAINING NOTES
No. 3

For study and file with Training Memorandum No. 1[1]

THE ARTICLES OF WAR

PREVIOUS notes emphasized the importance of control, and outlined some of the habit-forming methods of acquiring it. Close order and other drills provide the best means of forming in the men habits of accepting control by the officers.

We must remember that in war all able-bodied citizens owe military service to the Government. The citizens assigned to officers for military training vary greatly in type, tendency, and mentality. Even so, control and acceptance of control are so essential that a code of laws is provided, in the form of the articles of war, that gives the leader ample authority and power to demand proper response to his control. Fortunately we do not engage in war unless the people of the country not only approve, but insist upon it; and citizens inducted into military service usually report for duty possessed of the determined spirit of the nation, which facilitates their military training.

It cannot be too strongly impressed upon you that laws, especially criminal laws, are designed for a very small percentage of our citizens. For instance, the law that says in effect "He that murders his fellow man shall upon trial and conviction therefor be hung by the neck until dead" is designed only for the few who have murder in their hearts. The articles of war which prescribe severe penalties for their disregard or violation are designed primarily for the small percentage of our military population who are reluctant or who refuse to cooperate in meeting the requirements of national defense. By means of the courts operating under the articles of war, we are compelled at times to indicate to the reluctant few the comforts of cooperation as opposed to the discomforts of refusal to respond to control in training and in battle.

Of course the laws—the articles of war—for the government of soldiers, must be read and explained to them, but it must be done with such care and tact as not to leave the impression that you are now gleefully waving a big stick with which you will drive to get results.

The manner in which an officer

[1] See INFANTRY JOURNAL for January, 1930, page 77.

makes use of the articles of war easily defines the leadership that he exercises over his unit. If he depends for control solely upon the driving capabilities of the articles of war he becomes a man driver. He must resort frequently to threats, the implement of the weak; he controls through fear, rather than through an imbued spirit of cooperation and loyalty. Such control does not endure; it breaks as soon as the driving stick breaks, and usually when control is most needed. Officers are too busy in war to be taken from the battle fronts to sit on courts; consequently, man-driving, fear-inspiring methods will not endure the first campaign.

The leader must sometimes use the courts. They serve as aids in the sense that the traffic officer's second or third warning is more effective when it is accompanied by a fine. But the leader must foster fear of courts in any criminal element that may have been inducted into the military service. While judiciously using the courts, the leader works for the development of sentiment in his unit for right and against wrong procedure. In other words, he moulds opinion and enlists the momentum of opinion on the side of right. Soldiers, like citizens, are loath to run counter to unit or public opinion.

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Waterloo Was Won on the Fields of Eton

LIEUT. B. M. MCFADYEN, Infantry

This paper is the third of a series of playlets by Lieutenant McFadyen. In each one the author brings out one point of training or organization in such a manner as to invite further thought by the reader.—EDITOR.

ACT I

TIME: Afternoon, early fall.

PLACE: The gymnasium.

CAST: The coach and the football squad, assembled for skull practice.

COACH: "Today we are going to study the defensive by working out some problems based on the last lecture." (He produces seven red blocks and seven blue blocks and puts them on a table that is marked to represent a football field.)

1ST. QB.: "But Coach, there is one thing that I don't understand about that defense lineup you gave us last time. Here is the other team lined up close together so that it can bunch against us, yet here we are spreading out to stop them. It seems to me that they could drive us off the field when we are spread out like that."

COACH: "But you forget one thing. When all is said and done, the man with the ball must come in just one direction. Now the other team may make any number of secondary attacks, either to deceive you and suck you in, or to hold you fixed over in one corner of the field while the man with the ball makes a touchdown. So here is what we do. We put our men in the principal places over which the plays may come, such as through the center, off tackle, around the ends; and when the ball is snapped we have somebody there no matter which way the ball carrier comes."

1ST QB.: "Sure. I see now. And then our backs pile on him."

COACH: "Attaboy." (He then moves the blocks that represent the red team into an offensive lineup. He partially

lines up the blues.) "You, over in the corner. What position are you out for?"

R.O.T.C.: "They told me end, sir."

COACH: "Then come over here and arrange these blue blocks and show me where you would play on the defense. No, wait a minute. Have you ever played football?"

R.O.T.C.: "Not much, sir, but I can arrange those blocks." (He goes to the table and places the ends out from the rest of the line.)

COACH: "Now why did you place them there? It is the right place."

R.O.T.C.: "Because the enemy team might decide to go completely around us, so I put that combat post out to protect our flank. If they do decide to envelop that flank he will protect us."

COACH: "What do you mean by 'combat post'? That's an end."

R.O.T.C.: Excuse me, sir. We get into the habit of calling them that over in the military science and tactics classes."

COACH: (Curiously) "Do you understand why we scatter our line when on defense?"

R.O.T.C.: "Yes, sir, we do the same thing in our tactics, except that we hold out some men to hit the enemy with when we find out where he is coming."

COACH: (Grins and produces the backfield blocks) "Well, we are not so far behind the times in football. We hold them out, too."

Curtain

ACT II

TIME: A week later.

PLACE: The same.

CAST: The same.

COACH: "Today we are going to work on the attack. I gave you defense last week. When you decide on what to do in attack remember your defense lessons. (He produces the blocks and lines the red team up for defense.)

1ST QB.: "What are you using the reds for?"

COACH: "Now all of you prospective quarterbacks keep your eyes open. Look at these red men, because they will have a whole lot to do with your plans."

2ND QB.: "What do they have to do with us? They don't know what play we are going to use."

COACH: "Listen. If you ever expect to be a quarterback or any other kind of a back, get this once and for all. If you were driving down a road and you came to a place where fallen trees blocked the road, would you go over the biggest trees, or would you get out and look around for the best way through? Those red men are blocking your road."

1ST QB.: "Sure. I see. Figure out what they're ready to stop, and then cross 'em."

COACH: "Smart boy. Now all of you get this one." (He changes the red blocks until the line is very close together and the ends are almost touching the tackles.) "Quick! What play are you going to use?" (He points to a player.)

CENTER: (Who was at the end of the finger) "Buck it through center."

2ND QB.: "Delayed spin."

GUARD: "Send it over me. They're close together and I can drive through."

COACH: (He points to R.O.T.C.)

R.O.T.C.: "Envelop them."

COACH: "What do you mean?"

R.O.T.C.: "They are close together and they haven't anybody guarding

those flanks. I'd hit them in the line with my secondary attack to hold them while the man with the ball ran around one of those ends."

1ST QB.: "Sure. I see. End run when they're jammed in close like that."

COACH: (Sarcastically) "Smart boy." (To R.O.T.C.) "That's the idea, though. But are you going to send him around there all by himself?"

R.O.T.C.: "No, sir, I'd send everybody I could spare so as to knock out those reserves. That frontal attack doesn't have to be so strong, so I'd send some linemen around if I knew how to get them out of the line."

GUARD: "Let me go. I know how to get there."

HALFBACKS: "Sure. We know how to do it."

COACH: "You know everything about it except the most important part and that is when to do what. Watch this." (He arranges the red blocks with very wide intervals.) "Now that line is spread too much. So this time, instead of going around it, we are going through it, find a weak spot and hit it hard. Then if their lines huddle together again, why we can go outside of tackle or around an end again. But remember, no matter which way you go, through or around, there has to be another effort in order to keep the other team in doubt and suck in the defense. When we drive through the line what happens to those backfield men who are backing up the line?"

R.O.T.C.: "When we drive through our interference must widen the gap by spreading out to the flanks and blocking those men, so we had better hit that point hard with enough support to look after the enemy's reserves."

COACH: "Now, R. O. T. C., the same play. You are running interference for the ball carrier. You have gotten through the line. Just in front of you are two defensive backs. They are abreast of each other, but are about ten yards apart. Which man are you going to take out?"

R.O.T.C.: (Slowly) "It depends on the scheme of maneuver. It will take all of my strength to take out one of them. They are both the same distance from me. I believe that if the runner intends to cut to the right I should take out the man on that side, but if he intends to cut to the left I should take out the left man. I should always do what will further the main effort, that is, help the ball carrier to get free."

COACH: "Now we are getting somewhere. What R.O.T.C. just said was jumbled around, but it is the basis of all of our plays. Every man knows what each man is going to do. Then, if you get a fielder's choice, why do the thing that will clear the road for the ball carrier."

1ST QB.: "Coach, I'm beginning to get on to this stuff. As I see it, we have some rules to go by. But the rest is thinking out plays as we go along. For instance, back in that setup where you said end run, if it had been fourth down and, say, seven yards to go, with the ball in our territory, why we'd have had to kick."

COACH: "Now you are talking! That's it exactly. You are the quarterback, the director of play, or whatever you want to call it. You look at the other team. You look at your own men. You figure what your men and the men on the other team can do. You look at the ground to see where you are, how close you are to either goal line, how close to the sidelines, how much you

need for first down. Then, and only then, do you say what play to use."

2ND QB.: "Sure. Estimate the situation. There isn't any use of running an end run into the sidelines."

COACH: "Now here is another setup. The reds are holding you. They have two ends who are smearing you on every end play. You can get through the line, but the secondary is on you before you can gain. What to do?"

ALL: (A puzzled silence with many wrinkled brows.)

1ST QB.: "It seems to me that it's about time for an increase in fire-power on those reserves." (He mutters to himself and starts to count on his fingers—rifle—bayonet—machine gun—now what is that other one?—angle or angel, high something. His face clears.) "Why sure. Give 'em some high angle fire from the mortar."

2ND QB.: (Excitedly) "That's it. Forward passes. Throw some forward passes behind them. If they don't scatter out we'll make a touchdown and if they do scatter out they can't stop us through the line because they will be kept back there until after the play has started."

COACH: "Smart boy!" (But not so sarcastically) "How did you guess it?"

2ND QB.: "We joined that M.S.&T. class."

Curtain

ACT III

TIME: A week later.

PLACE: The same.

CAST: The same.

COACH: "As this is our last skull practice before the game next week I am going to give you a short review. There are principles that govern every game or occupation, and football is no exception. I want you to remember these principles and use them every time you have a job to do. The first one is, have something definite toward which to work. Don't run the ball for several downs and *then* try to decide which play will score. Before you do anything, decide which play will score, and then call all other plays to lead up to that play.

"Next, you can't make touchdowns without the ball. Get the ball and don't lose it. A good defense is fine, but get on the offensive and stay there. And when you are on the offensive, put power into it. Don't send your men wandering all over the field, but put interference in front of the runner—put your punch where it is needed. But here is one ticklish point which you must decide at the time. Save your energy by using some plays that you don't expect to have gain a lot and sandwich these with the power and surprise plays.

"An old play will make a touchdown as fast as a trick play if you spring it as a surprise; a trick play is just a surprise. Have you ever seen a team's running attack completely stopped, and suddenly some back reels off thirty or forty yards? Probably that time no one gave the play away in advance. Theoretically, every play is good for a touchdown, if it is properly executed and surprises the opposition.

"Trick plays and triple passes will work against a weak team, but when you tackle a tough team and the going is hard, stick to simple plays. Last year we lost the big game on an intercepted lateral pass when we had three downs to make two yards. The joint effort of every man on the team, the utmost in teamwork, is necessary to score. A back can't gain when the line

leaks, and no line can win when the backs pile up or fumble.

"Finally, a team can't be beaten when it has the will to win.

"That's all for today." (He turns and goes into his office, followed by the assistant coach.)

2ND QB.: "That was a good talk the coach made. I never thought about those things that way. But he left out two principles."

1ST QB.: "What about that last one he gave us?" (The players leave just as the coaches return.)

ASST. COACH: "It's going to be a hard job to find some one in that crowd who can call the plays."

COACH: "Oh, maybe somebody will develop."

ASST. COACH: "That R.O.T.C. boy knows more real tactics than anyone else. But he doesn't know football language."

COACH: "I've been thinking about that. Those tactics of his are pretty sound. In fact, I wish that all of the squad were in those military tactics classes."

ASST. COACH: "That would be a good joke on those army officers. Teaching our squad football tactics and calling it military science. All we'd have to do would be to tell them that an end run was like one of those envelopments."

COACH: "Funny, isn't it? And if they had some greenhorn recruit who knew football they could order him to 'take and place this outfit for defense' and he could do it, too. Of course there is a whole lot of difference in the fine points, but if I had to teach military in a short time I'd try to put the idea over by talking football to them."

ASST. COACH: "Sure. In this day and time nearly every boy or man knows something about football—that is, except our squad. Why the other day I saw some grade-school kids running interference to beat the band."

COACH: (Speculatively) "Let's tell that army officer and get him to try it in his classes. Tell him to teach one of his problems in football language and see what happens."

ASST. COACH: "Who starts as quarter?"

COACH: (He grins) "R.O.T.C. Turn about is fair play."

Curtain

ACT IV

TIME: A war.

GUARD: (now a lieutenant) "Captain, a runner is here with a message from the major that the company is to hold this position on Football Hill. I wish we knew what to do."

1ST QB.: (now a captain) "What's the worry? You go get that line straightened out for defense, tell the center to play back until the ball is snapped and put the tackles on that high ground where they can smear the play, and get the ends out wide in case of an end run."

GUARD: (Eagerly) "Sure, I see. And you get hold of the backfield and have them back up the line."

RUNNER: (To himself) "What are they talking about?"

* * *

Enemy Report: "*Attack on Football Hill failed. Position too well organized.*"

Curtain

The Infantry

REGULAR — NATIONAL GUARD — RESERVES

Antiaircraft Rifle Firing Practice in the Infantry Regiments

THE infantry regiments are conducting antiaircraft rifle firing under the provisions of Tentative Training Regulations 300-5. They are keeping careful record of the results and are making recommendations for changes in and addition to those regulations.

In order that the whole Infantry may know what is going on, the JOURNAL will make reports of the regiments. If it is not possible to publish all of the reports, the JOURNAL will at least extract and publish the paragraphs that are of special interest, with their source.

The first report of the series, which appears below, is that of the 23d Infantry. A special feature of the work of that regiment is that it emphasized the training of a large number of men in a short space of time.

REPORT OF ANTIAIRCRAFT FIRING OF THE 23D INFANTRY, SEASON 1929

The antiaircraft training of rifle troops of the 23d Infantry for the season of 1929, was conducted according to Training Regulations 300-5, modified to meet local conditions. This was followed by firing at towed targets by rifle sections. The object of this training was to secure a heavy and accurate burst of rifle fire, instantly, upon low-flying aircraft, from troops on the march, in combat formations, or in bivouac.

No attempt was made to fill the rôle of artillery or machine guns, nor was any firing done at altitudes of more than seven hundred feet.

Cover and security formations other than those necessary for fire control were not used, as counter action by fire was, as far as could be determined without actual combat, found to be the best available defense against aircraft.

Rather extensive experiments were made to develop sound and practical methods of training large numbers of troops in a short time.

For this purpose, a range was constructed, on which three thousand men could be trained in seven hours. The system of instruction was very simple. It consisted of a senior instructor, nine officer assistants, thirty noncommissioned officers, details of range mechanics, and so on.

The regiment was divided into eight-man groups, by battalions. The groups in each battalion were numbered, first, second, third, etc.

Lists were prepared that showed each man in the battalion, by name, in group order. Opposite the name were the scoring spaces for each class of firing. Such a list was furnished

General View of the Antiaircraft Range

to the officer in charge of each section.

The regiment was marched to a demonstration field at the end of the firing line, where the course of instruction was explained and demonstrated by the senior instructor and the demonstration group. Officers and noncommissioned officers were especially selected and carefully trained.

The regiment then marched into the training area, by orders. The first order consisted of twenty-four men, the first eight-man group of each battalion. Each order was divided into two relays, each consisting of three half-groups of four men from each battalion group. The officer in charge of the first section received the first order, checked it on his list by name, and gave his instructions by coach and pupil method, in which one relay acted as coach, and the other as pupil. He scored the firing, or the triangles, and dismissed the first order, which then reported to the officer at the second section. The second order was on the ready line at section No. 1, and reported to the officer in charge as soon as the order ahead had cleared the line. The entire regiment passed through the training area in this manner.

On moving targets one relay, consisting of three half-groups, fired while the other relay furnished the motive power for the target.

The range was built to conform to this method. It had twelve firing points at each set of targets.

Each class of targets was built in a section by itself, and all sections were placed on one straight firing line, with ample space between sections to permit individual section operation.

Sighting and aiming sections were

The Stationary Targets

Triangulation Section

placed back to back with the firing sections and separated from them by a thirty-yard street. A demonstration was provided where the entire regiment could be assembled for instruction. The demonstration, aiming, and stationary fire targets were standard, three-foot by five-foot machine gun targets.

The moving parallel targets were three feet by ten feet. These were run on a three-section four hundred and twenty-five-foot track, pulled on alternate ends by men on the end ropes. Four men on each end were ample. Three cars ran in tandem and carried twelve targets. A thirty-foot screened track section connected the forty-four-foot firing section.

The vertical moving targets consisted of a suitable uprights mounted on three forty-five-foot poles. The target frames were made in two sections, four feet by twenty feet each, carrying six targets. These were run on taut cables for rails and pulled down by man-power, and caused to rise at the prescribed rate of speed, by falling weights. Constant speed was maintained by ramps, weights, and cable slope.

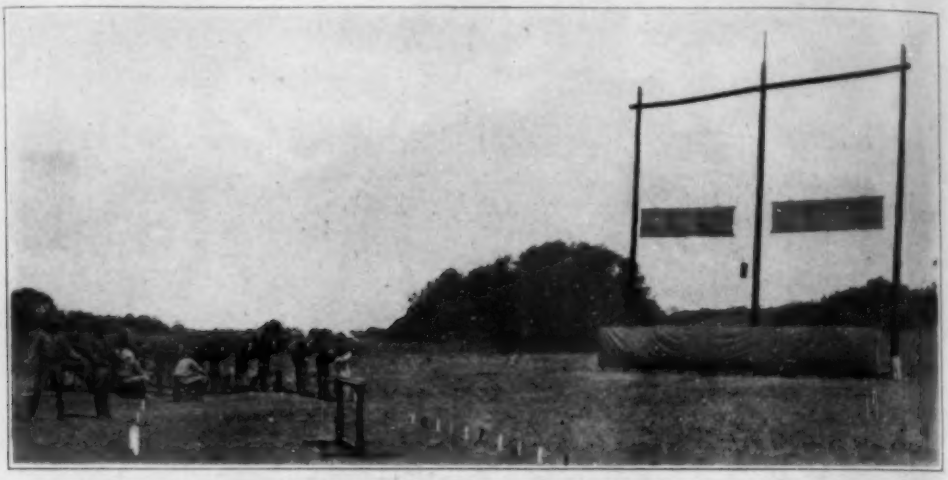
The prescribed target was not used, as it was found impractical for troop training. Silhouettes of standard size, ten and one-fourth inches by four inches and six and one-fourth by four inches were used instead, and shots were scored as hits or misses on this improvised target. In order to secure individual shooting and prevent firing on the wrong target, a system of alternate red and blue silhouettes, with correspondingly colored pegs on firing points, was used. This proved highly successful.

The target sections were numbered consecutively, and the leading groups of the battalions advanced in order from one section to the next.

The .22 caliber rifles of each organization were pooled and placed on the firing line and remained there during the day's firing. Supply sergeants and mechanics were in charge of cleaning and securing rifles. Each supply sergeant had charge of the rifles from his own company.

In the training, given as prescribed in Training Regulation 300-5, the second proficiency test showed a gain of seventy-one per cent over the first.

The average of this regiment was 23.8 per cent hits on the parallel moving targets, and 23 per cent hits on



The Vertical Moving Targets

the vertical moving targets, using target light lead.

One section, twenty-one riflemen, fired at towed targets. Target speed seventy-five to ninety miles per hour; slant range, seven hundred feet; two hundred and ten shots per target. On targets coming directly over troops, eleven hits were made on one and nine on the other. No tracer ammunition used. On targets moving parallel to troops, two hundred and ten shots were fired with no tracers and one hit was made.

Second target under same condition, using sixty per cent tracers, was hit nine times in two hundred and ten shots. Wind twenty to thirty-five miles per hour.

From this practice, it is very evident that low-flying enemy planes can be hit by ground troops. The effectiveness of the fire would naturally depend upon the amount of protection on the plane and the armor-piercing quality of the bullet.

In summing up the antiaircraft firing of this regiment, the following recommendations were made:

That the antiaircraft score-book be discarded as being impractical.

That miniature silhouette targets, sized according to speed and range, be used and scores be recorded by number of hits. The present system of scoring is impractical, as it requires an excessive amount of time and is too fine an adjustment for this class of firing.

That the antiaircraft ranges be built in such a manner as to allow a large number of troops to be trained in a short time.

That mixed tracer and ball ammunition be fired.

That twenty rounds (sixty per cent tracer and forty per cent ball, alternately placed in each clip) be carried in the right-hand front pocket of the belt.

That troops be taught to fire instantly, without any halt order, or any attempt to take cover, upon some such order as, "Three lengths, Fire."

That the possibility of armor on an enemy's planes be considered when determining the caliber of the army rifle or automatic rifle.

That the first proficiency test be dis-

The Parallel Moving Target

continued. It has been found that it is injurious to the morale of an organization to have the men shoot before they have had proper training. It is suggested that instead, a standard target be procured and that ratings be given for prescribed proficiency.

That this term, "antiaircraft firing," be changed to read, "Aircraft firing."

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Regular Infantry

THE training of the 3d Infantry Brigade, the 9th Infantry and the 23d Infantry, lays particular stress on keeping the command ready for field service. Training in combat operations makes up a large part of the work. Battalion commanders hold weekly tactical exercises for their battalions; the regiment has two combat training days each month; and the entire brigade takes part in one or more tactical exercises per month. Field artillery, tank, and air corps units also take part in these exercises, and the chemical warfare officer of the 2d Division provides chemical warfare materials. In this way the battalions, the regiments, and the brigade itself receive constant practice in combat situations, in which they work with some of the Infantry's battlefield auxiliaries.

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The trigger squeezers of the 3d Infantry, Col. W. C. Sweeney commanding, will have another busy season at Fort Snelling. The regiment is sending challenges for telegraphic small bore rifle matches to all infantry regiments of the Army, including those at foreign stations. This is a considerably more ambitious program than that of last year, which included only the regiments of the United States proper.

There are also some intercompany matches in which every man will fire. The target frame that Capt. R. F. Arnold, 3d Infantry, developed, will make the work more enjoyable. This frame is built so as to be operated from the firing point and so as to bring the bull's-eye of the indoor target always to "twelve o'clock" at the time of firing.

As an incentive for close competition the commanding officer has provided for cash prizes aggregating one hundred and five dollars for the small-bore firing. Teams in the first three places

in each class will receive ten dollars, six dollars, and four dollars. High scores in teams by individuals in the first five places in the teams will receive five dollars, four dollars, three dollars, two dollars, and one dollar.

The 4th Infantry, Col. J. K. Partello commanding, has finished its intercompany small bore matches for the season at Fort George Wright, Washington. A group of the best riflemen are now competing for places on the regimental team. Hopes are high that this team will be fully as good as the one that represented the 4th Infantry last year.

In order to provide safe and sane sledding for the youngsters of Fort George Wright, Colonel Partello has had a toboggan slide built out of scrap lumber. The chute is twenty feet high and one hundred feet long.

In the 15th Infantry, Col. J. D. Taylor commanding, there is a new policy that requires all men, including members of the Quartermaster Corps and other services, who arrive in China, to attend an extensive course in recruit training under especially detailed officers and noncommissioned officers. Such a course began on October 18 for the replacements who arrived in China at that time. The results were so satisfactory that by October 31 the men had all been returned to their organization for duty.

During October two officers and two enlisted men who had enrolled in the Chinese language school completed satisfactorily the course in the Chinese spoken language. Twenty-four officers and one hundred and fifty-three enlisted men are now students in this school.

The Armistice ceremonies at American Barracks, Tientsin, China, are simple and impressive. Perhaps nowhere else in our Army were there so many representatives of foreign countries present to assist in an American Army unit's observance of the day. One of the impressive moments came with the decoration of the memorial tablet

Representatives of Foreign Countries Pay Tribute to America's Part in the World War on Armistice Day, 1929, at Tientsin, China

in the American compound. The tablet was decorated with seventeen wreaths. Each representative placed his wreath and then stepped back to uncover or salute, according to the custom of his country.

In the 29th Infantry there has been time between drills and demonstrations to develop and equip fully a government licensed amateur radio station. Under the direction of Private Shinn, Headquarters Company, 2d Battalion, soldiers of the regiment do the work. Station W4HU now maintains regular communication with several hundred amateur stations all over the United States, Canada, and Hawaii. It sends an attractive call card to all stations with which it communicates. The equipment is modern in every respect; the soldiers who operate the station built or bought most of it out of their own funds. The station is pleased to send messages free of charge. This project appears to be important from both the points of view of training and recreation.

On December 6, 1929, the 1st Tank Company, 1st Division. stationed at Miller Field, New York, awarded prizes and medals to members of the organization for high scores made during the tank marksmanship firing at Camp Dix. Col. Adolphe Huguet, commanding the special troops of the division, presented the prizes. Corp. William Riddell won the first prize, a handsome silver cup, for a total score of 364 over Course A, Tank Marksmanship, which is believed to be a record. For the first time the 1st Tank Company, Lieut. B. K. Erdman commanding, qualified one hundred per cent in tank marksmanship.

National Guard

Marksmanship and the National Guardsman

Lieut. Floyd D. Gibson, 132d Infantry, Illinois N. G.

TRAINING in the art of shooting has for years been one of the outstanding features of the training program of all combatant units of the military service. An infantry man who does not know how to handle the weapon with which he is armed is of little or no use to his unit when in action. But he cannot know this by mere instinct. Marksmanship is an art to be cultivated. It is not born in the individual. It is easy for some and hard for others to acquire, but in any event it takes a certain amount of conscientious training on the part of the individual to become proficient in the art.

The training program of the Regular service is a very definite one. It develops the individual soldier from the theory to the art of shooting, through successive steps each day, until it develops in him a high degree of skill in shooting. He is put through a definite program on the gallery and the outdoor range. He has competent

instructors. In this manner the qualification percentage of the Regular service rises very high.

The marksmanship training of the Reserves is entirely in the hands of the Reservists. Regular army and civilian rifle ranges are available throughout the country, but the number of young men to be attracted through a personal desire to learn to shoot well is very small. In many places the universities and colleges have taken up marksmanship as a minor sport or in conjunction with their military departments. This, however, reaches a very small percentage of the large number of our Reserves.

The National Guard, the civilian soldiery of the nation, is the force that will have to uphold the rights and ideals of the United States when they are challenged. It is to this unit that we must give sufficient training to enable its members to use the weapon with which they are armed, and to use it effectively. The actual training of these men rests directly upon their company commanders. In very many instances the company commanders are unable to train their men properly. They are unable to teach marksmanship because they are not marksmen themselves, or because they do not have the proper support.

It is as impossible to teach marksmanship from the written volumes on that subject without the personal knowledge of the art from a practical standpoint as it is to teach any other sport from theory alone. A marksman must be made through his own efforts. Then, and only then, is he in a position to teach others with proper success. When the instructor of a group of men can actually show his men that he can shoot well he gains their confidence and stimulates in each individual a desire to learn. Then he can give the men proper instruction and plenty of actual practice under the direction of competent coaches.

The National Guard soldier is also handicapped because he is under instruction only one and one-half hours a week. His attendance greatly hampers his training, as it is not always that he can attend drills. The training of this man is doubly a hard one. Capt. M. G. Browne, Infantry, assigned to the 131st Infantry, Illinois National Guard, wrote in an article on marksmanship that the only solution to training the National Guard soldier is to make absolutely sure that he is started properly and has had the full value of the basic training before allowing him to shoot the service rifle. One kick by the service rifle invariably causes him to develop flinching, a habit that it takes years to break.

Pads are essential on the outdoor range. A sore shoulder will always produce little habits such as shifting the rifle on the shoulder, flinching, and failure to grasp the piece properly. These things, however little they seem at the time, are very big handicaps to the development of the individual's shooting and the possibility of better scores.

There seems to exist still another handicap that is very detrimental to the marksmanship training of the National Guardsman. In order that the men in each unit may be qualified each year it is necessary to ask the men to spend a few days of their time on the outdoor range each summer. Very often only the same few men respond to such training, so that the vast ma-

jority fail to get it. Only those few who make shooting their hobby are found to give the proper response. A company of soldiers cannot be developed on this material alone. More men must be trained. The problem is, how can we do it?

Assume that you are a company commander and are confronted with this problem. If the proper authorities place in your hands an order to call your company into service three days each year for the purpose of qualifying the men and teaching them marksmanship in a practical way, and give you your choice as to when to call them, your problem would be solved. This can easily be done, and with very little expense to the state governments.

The following resolution was read before and adopted by the officers of the Illinois National Guard at the state convention held in Chicago in 1928. It offers a goal for the individual soldier and a tool for the company commander to use in handling the marksmanship situation so as to reach the large majority of his men.

Resolved, that for the purpose of teaching the art of marksmanship to a greater number of National Guardsmen and in a more uniform way, the state government of Illinois authorize base pay for officers and men for a sum of three days in each range season. The first two days to be devoted to firing the practice course, and the last day to firing the record course. This will enable the company commanders to require each man of their companies to fire the qualification course at least once during the year.

Be it Further Resolved, that any officer or man will not be entitled to receive pay who does not fire as required by Training Regulations 150-10 and submit his scores for record. Such scores to be turned in on the day of firing and to be compiled at the close of the range season. Such season record scores to be marksman or better, or if unqualified they must show that the complete instruction course has been fired by the individual, and according to Training Regulations 150-10.

Be it Further Resolved, that any officer or enlisted man who qualifies as set down above be allowed a bonus, as an incentive to higher qualification, of a sum not to exceed two dollars in all, and to be proportioned to the qualification made. This to be added to his pay for the number of days attended, and a payroll submitted at the end of the range season by regimental commanding officers.

So far there has been no action by the State of Illinois on the above resolution. But it is hoped that Illinois National Guard authorities will see to it that sufficient funds are available next year so that the recommendation contained in the resolution may become a fact and spread the training of marksmanship to the larger body of troops who are not receiving such training now.

We depend upon the National Guard for national defense in time of war and local defense in time of peace. It must protect the citizens of the national from other nationals and give local protection against riots and unlawful disturbances. Let us place in the hands of the National Guard a more definite and effective method of teaching and developing the fundamental of Infantry training, *the use of the rifle.*

Reserves

Training in Rifle Marksmanship in the R. O .T. C.

MAJ. H. A. WADSWORTH, Infantry, D. O. L.

THE following is a description of the system of training of the R. O. T. C. in rifle marksmanship at Oregon State College. It is offered with a view to an exchange of ideas on this subject.

At this institution the Reserve Officers' Training Corps consists of three units. The infantry unit has five hundred and seventy-nine men, the field artillery unit has five hundred and fifty-five men, and the engineer unit has one hundred and ninety-six men. The infantry and artillery units have regimental organizations, the engineers a battalion organization.

For the infantry and engineer units training in rifle marksmanship is a part of the course of instruction. It consists of the regular basic and advanced training of individuals and the development of teams to represent the college in intercollegiate competitions. For the artillery unit firing with the rifle is not required, but members are encouraged to train for and to participate in the various intercollegiate matches. An infantry officer is in charge of the training, assisted by an experienced sergeant.

The facilities for instruction in actual firing are a small-bore range on the campus, alongside the armory and easily accessible to students, and a thousand-inch range on ground outside the city limits, where service ammunition is fired.

The small-bore range is of the outdoor type, with overhead shelter at the firing point only. It accommodates ten men firing prone or twenty in other positions. This type of range provides firing under conditions of natural daylight. During the months of winter the cold is disagreeable and the rainfall a hindrance, and the temptation is strong to establish a range indoors with heat and artificial light. It has been found, however, that results are better when firing under natural outdoor conditions, and this system has therefore been adhered to.

The thousand-inch range is of the usual type, and is conveniently accessible. It requires no description.

Basic training in rifle marksmanship pertains mainly to freshmen, and is taken up at the beginning of the spring term. By that time members of this class have received sufficient instruction in the nomenclature, care, and use of the rifle to insure range discipline and to permit firing on the range with the .22 caliber rifle. For this purpose they are divided into groups of about forty. The "coach and pupil" method is used throughout. To avoid loss of time through attempting to zero a rifle for each student, the value assigned to each score fired is based on the size of the shot group. A complete record of the firing is kept, by means of which the student's progress is checked and his errors are corrected. This record is also of assistance the next year in the selection of the most promising shots from among the students who then return as sophomores.

Advanced training for those juniors

and seniors due to attend summer camp is also taken up during the spring term. In this instruction there is sufficient firing with the service rifle to familiarize them with sights, recoil, and report of the rifle, firing service ammunition. This firing is on the thousand-inch range. However, the greater part of the time of this group is devoted to careful instruction with the .22 caliber rifle on the small-bore range. Progress is more rapid this way, and experience shows that the men whose records are best with the .22 caliber rifle usually make the best records with the service rifle at summer camp.

During the spring term the small-bore range is also used for the training of sophomores in musketry. For this purpose it lends itself admirably to the arrangement and solution of firing problems for small units. Its facilities are such as to permit this training to go on without interfering with other scheduled firings.

The selection and training of the teams to be entered in intercollegiate matches, and the firing of the matches, take place during the fall and winter terms. Candidates for these teams are drawn from among those sophomores who, as freshmen, had shown special aptitude for shooting, and from among other students who appear to merit consideration for places on the teams.

For training purposes the candidates are divided into two groups according to proficiency. In the first group are those whose records in marksmanship entitle them to be placed on what is termed the "varsity squad," from which team members to represent the college are selected. In the second group are those whose records in marksmanship do not so entitle them. With further instruction and practice, however, members of this group are frequently able in a short time to win places on the varsity squad.

Cadet Carl A. Anderson

Oregon Agricultural College R. O. T. C. Winner of the Pershing Trophy and Gold Medal at the National Matches, 1929

From among the members of the varsity squad the forty-five best shots are selected at once and divided into three teams. Team No. 1 consists of the best fifteen shots; team No. 2 of the next best fifteen shots; and team No. 3 of the next fifteen. This classification is not permanent, however; from time to time promotions and demotions take place so that for any given intercollegiate match the first team consists of the then best fifteen shots and the second team, if entered, of the then next best fifteen shots. This

results in a constant scramble for a place on each team entered.

These teams are then put through a careful preliminary course totaling about six hours of training, after which competitive firing between them is begun. This firing conforms exactly to the conditions of the intercollegiate matches.

The range is open and the sergeant on duty is there throughout the day. This makes it possible for a student who wants a place on a team to practice at any hour of the day that his own schedule will permit. By this method there is a fairly constant flow of firers on the range throughout the day.

At the close of the intercollegiate match season, which is near the end of the winter term, sweaters are awarded to the fifteen men who have attained the highest average record of general proficiency throughout the period of the firing. On the breast of each sweater is the shield of the R. O. T. C. and on the sleeve a band for each year the wearer has won this distinction. Similarly, a specially designed medal suitable for wearing on the watch chain is awarded to the fifteen men who have attained the next highest average of general proficiency.

The above described system of training in rifle marksmanship of the R. O. T. C. at Oregon State College has resulted in marked success during the period of years in which teams and individuals have represented the institution. During the last seven consecutive years this college has won the IX Corps Area Gallery Rifle Match. Last year it won both second and third places in the William Randolph Hearst Match (Western Division). At summer training camp, firing with the service rifle, groups from this institution have won the IX Corps Area trophy, the "Doughboy of the West," three times out of the five times it has been competed for. Last year the college was represented at the National Matches at Camp Perry, Ohio, by two students, as members of the IX Corps Area R. O. T. C. team, one of them as the team captain. This year the college had three men on the Corps Area R. O. T. C. team at Camp Perry. One of these, Cadet Carl A. Anderson, Engineers, won the coveted Pershing Trophy and Gold Medal, awarded for the highest individual score made among the members of all the teams that fired in the National Rifle Match.

The 393d Infantry, Col. J. R. Langley commanding, belongs to the 99th Reserve Division, and most of its officers live in Pittsburgh. The regiment has just completed a very successful year. There were no skyrocket methods but rather training along sound lines. This included interesting meetings during the winter and well-planned active duty during the summer, encouragement of instruction by the battalion, and constant contact between the Regular Army instructor and commissioned personnel. The attendance at camp at Fort Howard, Maryland, last summer was sixty officers.

Books

FOCH: A biography, by Maj. Gen. George G. Aston, K. C. B. The Macmillan Company, New York, 1929. 482 pages. $5.00.

"Foch" is an absorbingly interesting and intimate biography of Marshal Foch as seen through British eyes.

Much of the book is devoted to the relations of the British commanders and politicians with Marshal Foch.

The style is attractive and the general treatment is sympathetic and searching.

The author keeps to the fore the singleness of purpose of Foch and his unswerving confidence in the ultimate victory of the Allies.

Every officer should read this book. Those who buy it will possess one of the outstanding books that treats of the World War.

Ⓘ

JULY '14, by Emil Ludwig. G. P. Putnam's Sons, New York, 1929. 378 pages. $3.50.

This illustrious and prolific German writer presents in his usual entertaining style his views of the real responsibility for the World War.

He says, "The war-guilt belongs to all Europe. * * * While exact calculations of relative responsibility are impossible, one can say that Vienna and Petersburg stand first; Berlin and Paris, their seconds, follow them, although at very different intervals; London comes a long way after." And then, with Teutonic thoroughness, he substantiates his views with an array of documentary evidence.

As a panacea he offers this interesting thought: "If Europe does not want to be dragged into another war, every country must pass laws forbidding any responsible minister to put on a gas-mask; then they will at once come to terms." Which leads to this question: Then what would happen should some *irresponsible* minister start a gas attack?

July '14 is informative and interesting, even though one may not agree with all of Ludwig's conclusions. It seems to this reviewer that the evidence of Germany's encouragement of Austria's attitude toward Serbia, as presented by Ludwig, pins the prime responsibility on Germany, for she could easily have withheld that encouragement. An unaided Austria would hardly have dared brave Russia's enmity.

The Infantry Association

The Road to Success

THE principal groups in the Infantry Association are Regular Army officers, National Guard officers, and Reserve officers. All of these, and other persons, receive the INFANTRY JOURNAL.

Whatever the JOURNAL may mean to the persons who receive it, to the officers of the Association it is the voice of the Infantry Association, a *cooperative association of officers of the Army of the United States.* So regarded, the JOURNAL is worth an occasional moment's thought. If there are any generally held ideas about the JOURNAL, those on which there is substantial agreement probably are:

It should be an attractive and good magazine in every way;
It should rank at the top among military journals;
Each number should contain material that is of interest and value to every reader—Regular, National Guard, Reserve, from general officer of long experience to new second lieutenants—quite a range!

These and any other desirable characteristics that meet the approval of its readers give the JOURNAL value and influence for good in proportion as it meets such views.

But to make the JOURNAL good costs money. And to make it better costs more money. And more money, in turn, means greater circulation and more advertising. Quality, money, advertising, and circulation, are interrelated and interlocked, and, if they are all good, they spell *success.*

Recognizing this, the officers of the Association and the Staff of the JOURNAL have laid out an ambitious program for the next three years. It is set forth here so that all interested persons may know the goal—and, through summaries from time to time in these columns, the progress toward that goal.

CIRCULATION

Much the largest part of the circulation of the INFANTRY JOURNAL is among Regular officers. As appears further on, we are planning changes and improvements to make the JOURNAL more and more worth while to all components of the Army, and so to increase its circulation.

Here are the quotas that we have set:

	Regular Army officers	*National Guard officers*	*Reserve officers*
End of 1930	80%	40%	8%
End of 1931	90%	60%	12%
End of 1932	95%	70%	15%

Also, we believe that the JOURNAL should be on the reading room table in the library of every Infantry organization up to and including the Infantry brigade.

CONTENTS OF THE JOURNAL

It is clear that the JOURNAL should include the kinds of material that each of the various categories of readers enjoys.

We are working on a plan to secure even better general articles, and more of them, and if our circulation and advertising efforts work out, to pay more for them. It is too early to describe that plan, but an increased flow of carefully thought-out and well written articles from our own members to the editorial desk would put us well on the way toward accomplishing it.

We are also going to expand and develop some of the weaker parts of the JOURNAL as soon as possible. To that end, we have particular need for articles and news items that are of interest to National Guard and Reserve officers.

We therefore, here and now, ask for contributions. And for the guidance of those whom this request may stimulate to write we repeat certain notes on the contents of the JOURNAL which we published in the number for October, 1929:

1. The JOURNAL gives preference to manuscripts which further the purpose set forth in Article 3 of the Constitution, which are written in good expository form, and which deal with subjects of which the authors have up-to-date and first-hand knowledge.

2. The JOURNAL needs historical articles, but they should be more than mere recitals of fact. The facts themselves should be accurate, but more important, they should be set down with some definite purpose, conclusion, or lesson.

3. The JOURNAL tries to maintain a reasonable balance between articles of a general and those of a technical nature. It needs both.

4. The JOURNAL prefers articles that do not exceed 3,000 words in length. It is our belief that readers of the JOURNAL prefer and give more attention to short articles that are clearly and concisely written than to articles that, no matter what their other excellence, are long, rambling, and difficult to read.

5. Manuscripts submitted for publication in the JOURNAL should be addressed to the editor. The copy should be neatly typed, double-spaced.

6. The JOURNAL is glad to compensate authors within the limits of its means. It is also glad to receive manuscripts as gifts.

7. The JOURNAL is glad to receive correspondence about published articles or about other matters of general interest. If the correspondents so desire, and if any good purpose is to be served, it will publish what they write in the Reviews and Discussions department.

ADVERTISING

Advertising in the INFANTRY JOURNAL serves several purposes. Being carefully censored to exclude undesirable matter, it brings to the attention of readers things for which they have personal or official need, and tells them where they can safely and advantageously buy those things—it serves as a line of communication between current supply and personal and official demand. In doing this, our advertising can prove to our advertisers that it brings their products to the attention of a superior kind of market—if the purchasers will mention the JOURNAL when they make their purchases. And, as important as its effect on the current market is its power to build up good-will that will bear fruit in time of development, expansion, or war. This good-will is built up in the professional journal representing a group of officers who are and will be representative of both the consumer demand and the policy making group—in brief, who will largely determine the purchases.

These facts, and others, we plan to use in a systematic and sustained effort to increase our advertising and make it more and more worth while to both readers and advertisers.

THE ROAD TO SUCCESS

The staff of the JOURNAL is setting out to do these things. It is using its best information and judgment. But

these are not enough. It also needs the help of every reader—in the form of information, constructive comment and occasional contribution. *We therefore ask every reader to give us the benefit of his knowledge and opinion, and active advice about his* JOURNAL. We shall later make this easy by sending out occasional questionnaires on prepaid return postage envelope forms. *Will you help us?*

Each hundred memberships or subscriptions that we can work together to produce means twenty-five dollars a month more to spend on the JOURNAL for illustrations, authors' fees, and general improvement. Let's get many hundreds.

Each new advertisement means a corresponding step nearer to our quality goal. Help us in this too.

Your Association does not operate for profit. When our operations do produce a profit we put the money right back into efforts toward better quality and into service to you, the members of the Association. Help us to build better service.

Help your JOURNAL *along* THE ROAD TO SUCCESS.

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